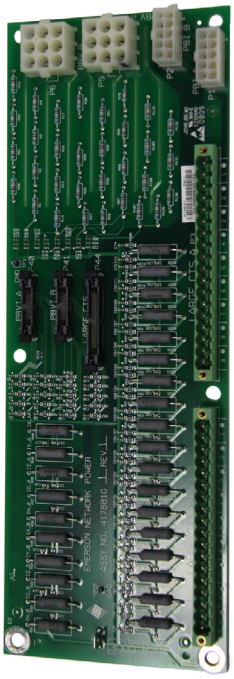
Liebert® LDMF™ Distribution Monitoring

User Manual



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IMPORTANT SAFETY INSTRUCTIONS

WARNING

As with all types of electrical equipment, dangerous voltages exist within the equipment where the Liebert LDMF Distribution Monitor components are installed. For maximum safety, ensure power is removed and circuit breakers/disconnects are tagged/locked out per all applicable national, state and local electrical codes prior to working inside equipment.

The area around the equipment must be free of any debris or standing water.

All power and control wiring must be installed by a qualified electrician in accordance with the NEC and all applicable national, state and local codes.

ONLY qualified service personnel should perform maintenance and/or service on the Liebert LDMF system. When performing maintenance and/or service on any component, verify test equipment is insulated and has been inspected prior to use.

To avoid damage to the circuit boards, personnel handling these components should be wearing an Electrostatic Discharge strap or other approved protective device.

When replacing or installing a solid core Current Transformer (CT), power must be removed from equipment to prevent damage to the CT and/or circuit board. If the CT is a split-core design, follow proper electrical safety procedures and ensure the CT wires are connected to the applicable burdening circuit before attaching the CT around the conductor.

These safety precautions are to be used in conjunction with NEC and local/state electrical code.

ELECTROMAGNETIC COMPATIBILITY—The Liebert LDMF as a functional component of a power distribution and supply product complies with the limits for a class A Digital Device, pursuant to Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device must not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Operating this device in a residential area is likely to cause harmful interference that users must correct at their own expense.

Liebert LDMF as a functional component of a power distribution and supply product complies with the requirements of EMC Directive 2004/108/EC and the published technical standards. Continued compliance requires installation in accordance with these instructions and use of accessories approved by Emerson Network Power®.

1.0 GLOSSARY OF ABBREVIATIONS

The following abbreviations are used in this manual.

BCMS	Branch Circuit Monitoring System
BMS	Building Management System
BSM	Branch Sensor Module
DSP	Digital Signal Processor
GUI	Graphic User Interface
HMI	Human-Machine Interface
IGM	Information Gathering Module
LDMF	Liebert Distribution Monitor Front Access
LDMFS	Liebert Distribution Monitor Front (Square-D Panelboards)
LDMFG	Liebert Distribution Monitor Front (GE Panelboards)
LDMFI	Liebert Distribution Monitor Front (I-Line Panelboards)
LDMF4	Liebert Distribution Monitor Front (480V Distribution Cabinets)
PAB	PM4 Adapter Board
PCD	Power Conditioning and Distribution
PDU	Power Distribution Unit
PM4	Power Monitoring 4th Generation
PIB	PM4 Interface Board
PLIB	PM4 Large Interface Board
PMB	PM4 Monitoring Board
STP	Service Terminal Port

2.0 PRODUCT OVERVIEW

The Liebert LDMF monitors the main panelboard circuit breaker and individual panelboard branch circuit breakers. The measurements are used to report the voltage, current and alarm conditions for each breaker. The Liebert LDMF utilizes branch circuit sensor modules and individual current transformers (CT) to monitor current. In addition, the Liebert LDMF monitors options like subfeed and output circuit breakers and provides a full array of power parameters and alarms.

The Liebert LDMF is available as an option for the Liebert PPC™, Liebert FDC™, Liebert FPC™, Liebert RX™and Liebert RDC™.

The Liebert LDMF system can communicate with a Building Management System (BMS) and Liebert SiteScan® Web via optional Liebert IntelliSlot™ cards or Liebert SiteLink® interface.

The Liebert LDMF consists of a monitor board, interface board, optional local display and Branch Sensor Modules (BSM).

The Liebert LDMF is capable of receiving input from current branch sensor modules. The sensor module (BSM) contains 100A current transformers (CTs) capsulated in an epoxy-filled plastic enclosure designed to be mounted next to the panelboard. Sensor modules are designed to work 3/4" or 1"-spaced panelboards. If a sensor module CT fails, connections are provided for up to six replacement CTs. The optional CTs can be attached directly to the load cable feeding the failed CT.

Higher-rated CTs can be used for monitoring optional subfeed circuit breakers. For subfeed breakers, such as main panelboard breakers, the Liebert LDMF monitors not only the 3-phase current but also the ground and neutral current. These subfeed circuit breakers are in addition to the panelboard circuit breakers that can be monitored through the BSM. The Liebert LDMF can accommodate 18 individual large current transformers.

If your Liebert power center is supplied with a Square D I-Line® panelboard, the Liebert LDMF can monitor it as well as its output breakers. A PM4 Large Interface Board (PLIB) replaces the panelboard PM4 Interface Board (PIB) and can monitor up to 42 CTs. Each PLIB can monitor eight 4-wire or 5-wire I-Line and/or subfeed breakers including ground and neutral current. There are two (2) PLIBs per monitor board that can monitor a total of sixteen 5-wire I-Line and/or subfeed breakers.

The Liebert LDMF system includes three Liebert IntelliSlot ports for remote communication. Optional Liebert IntelliSlot cards can provide the following remote communications,

- IS-WEBS card for SNMP/WEB with RJ-45 connection to Ethernet LAN
- IS-485S card for Modbus 485, 2-wire connection
- IS-IPBMS card for Modbus IP, with RJ-45 connection to Ethernet LAN

The Liebert SiteLink-2E™ is available as an option with the Liebert LDMF as an interface to Liebert SiteScan.

Tools and documentation can be found at the Liebert Web site: **www.liebert.com**
Under **Service and Support**, choose **Software Downloads**.

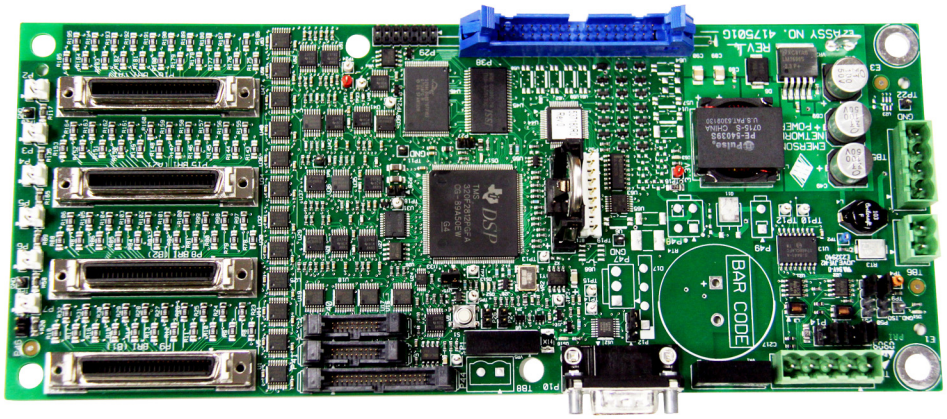
- Click on the link for the **LDMF - mm/yyyy Toolkit**:
  where **mm/yyyy** is the month and year of the update—for example, 08/2010 or 11/2012
  Note: There are two versions of Liebert Distribution Monitoring software.
  Be sure to select the **LDMF** version, which is for units with a setup port labeled **LDMF Setup**.
  Do NOT choose the Liebert Distribution Monitoring (LDM) Tool Kit. (The LDM Tool Kit is used on units with a setup port labeled LDM Setup.)
- Save the file to a desktop or laptop computer (PC) and extract the contents.

NOTE
The software may be updated and changed without any notification. Check the Web site regularly to ensure the software is up-to-date.

In addition to Liebert LDMF remote communications, an optional local display offers easy-to-use viewing of electrical data for various branch breakers as well as alarm details such as the type and source of each alarm.

3.0 MAJOR COMPONENTS

3.1 PM4 Monitor Board (PMB)



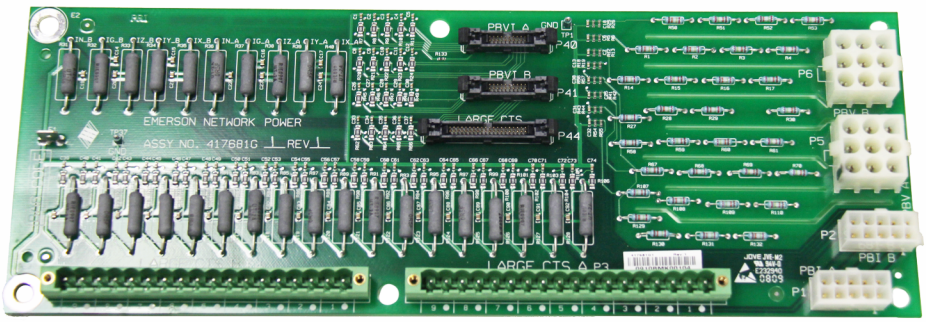
The PM4 Monitor Board (PMB) is the main processing and storage circuit board. The PMB contains the non-volatile memory where the configuration file is stored. The CT Module Assemblies will connect directly to the PMB via the 4 ribbon cables connectors. The PMB is a DSP-based logic controller with internal flash memory to store breaker configuration, alarms and energy data. The onboard battery supplies power to the real-time clock.

All the electrical parameters are accumulated on the PMB for processing to Liebert Velocity protocol for remote monitoring and the HMI interface for the local display. Kilowatt-hours (kWh) data is accumulated on this board for the panelboard mains, subfeeds and each branch circuit breaker. A remote command can be used to reset the accumulated energy data.

Additional PMB Capabilities

- Six (6) auxiliary CT connectors, which allow for replacing a failed CT.
- A DB9 serial port on the outside panel is available for local configuration.

3.2 PM4 Interface Board (PIB)



The Liebert LDMF PM4 Interface Board (PIB) provides connections for the voltage and currents of the panelboard main circuit breaker as well as the CT current for any installed large branches or subfeed breakers (maximum of 18 CTs).

For the large branches or subfeed breakers, the nine CTs on the A side of the board are normally associated with the A-side voltages for power calculations. The B-side CTs are normally associated with the B-side voltages. A cross-configuration tool allows changing that association for subfeeds.

The 18 large branch CT inputs can also be used to monitor up to three subfeed circuit breakers. This is configured using the configuration tool (see **5.5 Using the Configuration Tool**). The CTs from the B side of the PIB are cross-configured to the A side so that the three subfeeds appear within the A-side panelboard register space. The 18 large branch breakers require CT's with 1A secondary.

WARNING

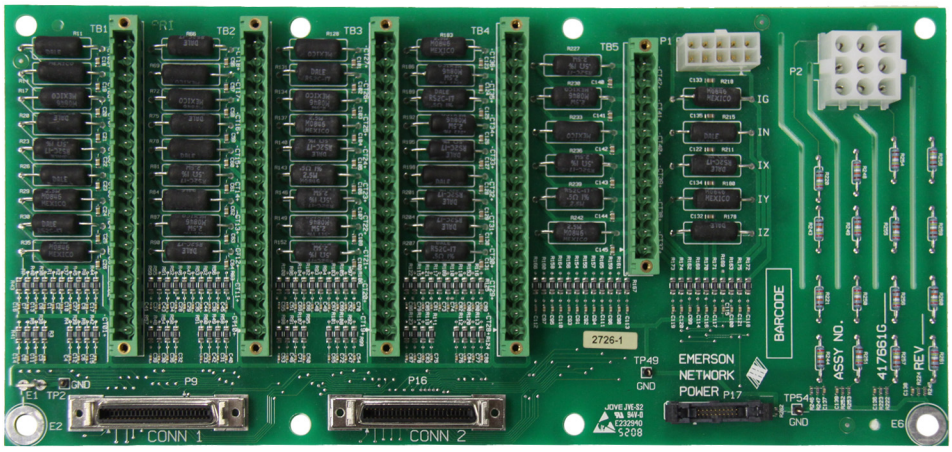
Before connecting a large CT to the PIB, note the CT MUST have a 1A secondary. Connecting anything other than a 1A secondary CT will damage the PIB and the CT.

To ensure the proper current ratio and accuracy, the CTs should be purchased through Emerson Network Power. See **Table 1** for details. Contact your local Emerson Network Power representative or call Emerson Network Power® Liebert Services at 1-800-LIEBERT (1-800-543-2378).

Table 1 CT matrix for the Liebert LDMF

Part Number	Description	Phase CT	Ground CT	Neutral CT
539217G1-L	3-pole 0-100A Subfeed Breaker 5W CT Kit	200:1	100:1	200:1
539217G2-L	3-pole 125-225A Subfeed Breaker 5W CT Kit	500:1	100:1	500:1
539217G3-L	3-pole 250-400A Subfeed Breaker 5W CT Kit	1000:1	100:1	1000:1
539217G12-L	3-pole 125-225A Subfeed Breaker 4W CT Kit	500:1	—	500:1
539217G13-L	3-pole 250-400A Subfeed Breaker 4W CT Kit	1000:1	—	1000:1
539217G4-L	3-pole 0-100A I-Line Breaker 3W CT Kit 47" Frame	200:1	—	—
539217G5-L	3-pole 125-225A I-Line Breaker 3W CT Kit 47" Frame	500:1	—	—
539217G6-L	3-pole 250-400A I-Line Breaker 3W CT Kit 47" Frame	1000:1	—	—
539217G7-L	1-pole 0-100A Branch Breaker CT Kit	200:1	—	—

3.3 PM4 Large Interface Board (PLIB)



The PM4 Large Interface Board (PLIB) provides voltage and current attenuation for Square-D I-Line panelboards. There are 42 CT locations on each LIB for a total capacity of eight 4-wire (3 phases and neutral) or 5-wire (3 phases, neutral and ground) breakers.

WARNING

Before connecting a large CT to the PLIB, note the CT **MUST** have a 1A secondary. Connecting anything other than a 1A secondary CT will damage the PLIB and the CT.

To ensure the proper current ratio and accuracy, the CTs should be purchased through Emerson Network Power. See **Table 1** for details. Contact your local Emerson Network Power representative or call Liebert Services at 1-800-LIEBERT (1-800-543-2378).

Two PLIBs are supplied for a total maximum monitoring capacity of sixteen 5-wire I-Line and/or subfeed breakers.

3.4 Branch Circuit Monitoring Sensor Module (BSM)

The Branch Circuit Monitoring Sensor Module (BSM)—more commonly referred to as the CT Module—contain 21, 27 or 36 individual Current Transformers filled inside an epoxy enclosure. Each load circuit is passed through one of the openings for branch circuit current monitoring. The signals leave the CT module via a ribbon cable which is connected directly to the PM4 Monitor Board (PMB) for attenuation and processing.

There are two BSM designs depending on the manufacturer of the panelboard installed:

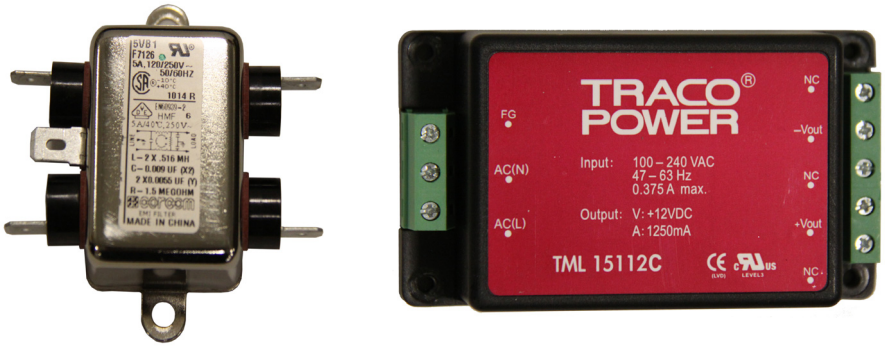
- Utilize 1" spacing between circuits.
- Utilize 3/4" spacing between circuits.

NOTE

The diameter of each CT hole is 0.433" (11mm). Wire diameter and thickness of insulation must be taken into account before wiring each branch circuit. Using wire that is too large may prevent the conductor from fitting through the CT hole. Do not attempt to alter the diameter of the CT opening.

For larger panelboards, the CT Module is designed to interlock to maintain alignment between the breaker poles and the CT Modules.

3.5 Power Supply With EMI Filter



The power supply assembly converts 100-240VAC (+10%/-13% range) 50/60Hz into 12VDC to provide logic level power for the PMB.

The Power Supply is fed from the line side of the panelboard main breaker. If during normal operation the panelboard main breaker trips or is turned off, the PMB will still have power to communicate alarms via the local display or remotely via Liebert IntelliSlot® cards.

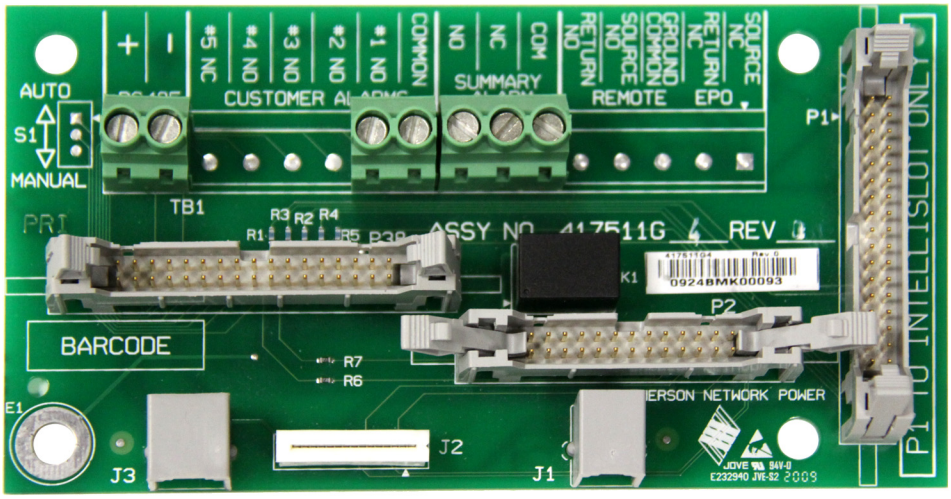
3.6 Human-Machine Interface/Display Assembly (Optional)

The LDMF allows users to view the panelboard circuit data locally through the optional display. The user interface has function keys to scroll through and view each panelboard's data as well as the associated branch circuits and/or subfeeds.

Along with the branch circuit data the LDMF Display also has an alarm annunciation window that lists all active alarms. The display has an LED status indicator that changes to red in the event of an alarm. The Silence/Reset button will silence the audible alarm when pressed once and held until alarm is silenced. When pressed a second time, the button clears the alarm and turns off the red LED.

Alarm thresholds cannot be added, deleted or adjusted on the local display. These functions may be performed only by using the LDMF Configuration software, which is available for download at the Liebert Web site. Refer to **5.3 Downloading the Software** for downloading instructions and see **5.5 Using the Configuration Tool** for details on using the software.

3.7 PM4 Adapter Board



- The PM4 Adapter Board (PAB) is provided with each Liebert LDMF. The PAB is typically mounted on the back of the display, which is located on the front door of the unit. The PAB provides a customer interface to the LDMF summary alarm contacts.
- If two Liebert LDMF systems are provided, the two PABs are connected to each other at the factory. It is only necessary to connect to one PAB to monitor the Customer Summary Alarm; the two Liebert LDMF units share summary alarm contacts.
- On the Liebert FPC and Liebert PPC the PAB has additional connections on TB1 that include Remote Emergency Power Off (EPO). The field-selectable switch S1 on the PAB allows the selection for either Manual or Auto restart. The factory default setting is Manual.
- Manual restart allows for an orderly supervised startup after power failure. The control circuit automatically energizes the shunt trip mechanism of the main input breaker upon sensing output voltage failure.
- Setting the switch to Auto deactivates the manual restart. In Auto restart mode, the main input breaker does not trip due to power failure and the unit will restart when power is restored.

NOTE
The TB1 connections for customer alarms 1 - 5 are used only with the VPMP product.

4.0 INSTALLATION

WARNING

Dangerous voltages exist in power distribution units and power conditioning units. To ensure maximum safety, all circuits breakers in the panelboard should be removed of power and the input feeder breaker should be turned Off and locked-out in accordance with NEC and local/state code.

NOTE

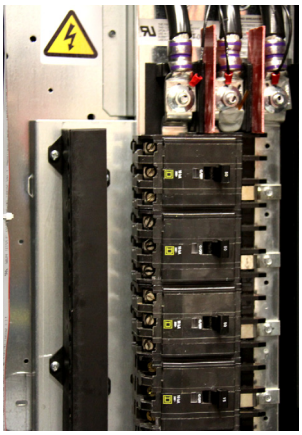
Liebert LDMF components and any other monitoring devices should be installed only by properly trained and qualified personnel.

This section provides instructions for installing and connecting Liebert LDMF current transformers. If any Liebert LDMF component requires service, contact Emerson Network Power® Liebert Services at 1-800-LIEBERT (1-800-543-2378) for assistance.

4.1 Installing a BSM (CT Module Assembly)

In most cases the BSM—the **CT Module**—is factory-installed and no further work is required. If a CT Module must be added, it attaches easily to the side of a panelboard to monitor any combination of 1-, 2- and 3-pole circuit breakers.

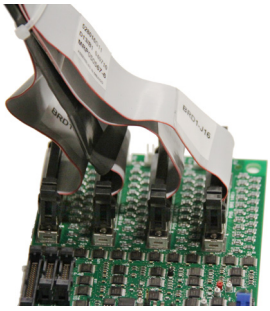
- For **side-by-side panelboards** (21 circuits on each side), attach one CT Module to each side of the panelboard, ensuring that the center of the CT hole lines up to the branch circuit breaker connection.
- For **Square-D Inline panelboards** (42 circuits in a row), the two CT second, lower CT Module so that the two cutout sections line up, then attach the screws to secure the CT Modules to the panelboard.
- **For GE Inline type panelboards**, the two CT Modules fit end to end. Flip the second, lower CT Module so that the 50-pin ribbon cable connector, mounted on the bottom of the CT Module, lines up with the hole in the panelboard mounting bracket.



Install the circuit breakers according to the manufacturer's documentation. Route the circuit wire through the center of the CT and attach securely to the circuit breaker.

4.1.1 Connecting Panelboards A and B

The CT Module connects to the PMB via a 50-pin ribbon cable attached to the back of the CT Module. Route the ribbon cable and attach to the appropriate connector (see figure at right).



There are four connectors that are labeled for easy identification: two for **Panelboard A** (A1 and A2) and two for **Panelboard B** (B1 and B2).

- Connect the CT module that will monitor Circuits 1-21 to the A1 or B1 connector, depending on whether the CT Module is monitoring Panelboard A or B.
- Connect the CT module that will monitor Circuits 22-42 to the corresponding A2 or B2 connector.

Circuits Monitored	Panelboard A Connector	Panelboard B Connector
1-21	A1	B1
22-42	A2	B2

To configure the branch circuits, refer to **5.5.11 Add a Circuit Breaker**.

NOTE

- *Panelboard A is either Panelboard 1 or Panelboard 3.*
- *Panelboard B is either Panelboard 2 or Panelboard 4 depending on which Liebert LDMF Control Board is being configured.*

4.2 Installing a Solid-Core Current Transformer

WARNING

A solid-core CT cannot be installed on a wire while current is flowing through the wire. Damage to the burden resistor and CT will occur. Power must be removed before installing and/or removing any CT. CT's should be installed only by properly trained qualified electricians.

The CT for the panelboard main input circuit breaker is hard-wired to the connectors. Removing CT wires from the connector requires a pin extraction tool.

Contact Liebert Services at 1-800-LIEBERT (1-800-543-2378) for assistance.

NOTE

When replacing or installing a CT, ensure that the replacement CT has a secondary rating of 1A—for example, 100:1, 200:1, 500:1 or 1000:1. Using a higher-rated CT—for example, 100:5 or 500:5-will damage the burden resistors on the PIB board.

Typically the three-phase and neutral wires utilize a CT rating of 100:1, 200:1 500:1 or 1000:1, while the ground wire utilizes a CT rating of 100:1.

Route the circuit wire through the core of the CT and wire-tie the CT to the cable. Refer to the manufacturer's documentation for proper orientation to ensure accurate readings. Generally, CTs have an arrow, white dot or similar marking to indicate how to position the CT.

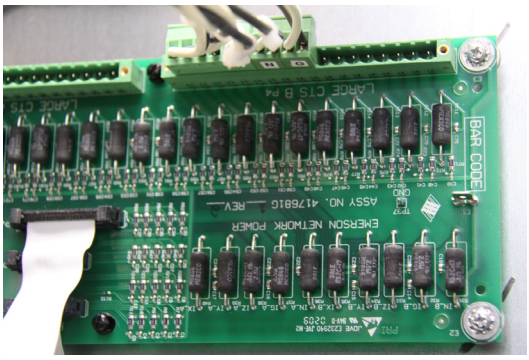
For the Liebert LDMF, CT's may face either direction on the three-phase wires and load on the neutral and ground wires. Orientation is self correcting.

NOTE

When installing CT's for a large branch circuit breaker or subfeed, verify which monitoring board is installed.

- *A PIB can support up to three subfeeds,.*
- *One LIB can support up to eight output and/or subfeed breakers.*
- *Two LIB boards are provided to support up to 16 output and/or subfeed breakers.*

4.3 Installing a Current Transformer on the PIB Interface Board



If subfeed breakers are ordered with the unit, the phase, neutral and ground CTs are wired to the Interface Board.The CTs will be zip-tied inside the equipment for the electrician to install on each conductor when the conductors are wired to the subfeed/large branch breaker. The ground and neutral CTs for each factory-supplied subfeed or large breaker are factory-installed and wired. CTs have a white or H1 that depicts how to position the CT on the cable to ensure accurate readings. The white dot or H1 must face toward the source when installing the CT on the phase cables. The neutral conductor CTs are placed in the opposite direction, with the marking faced toward the load. Route the conductors through the core of the CTs and wire-tie the CT to the cable to ensure the CT stays in place.

If subfeed breakers are installed in the field, up to five CTs may be installed (three phases, neutral and ground). The neutral and ground CTs may be omitted if monitoring of neutral and ground is not required. The 5-wire CT kits will be shipped separately and grouped together with each CT with a label indicating whether is a phase CT, neutral CT or ground CT.

There are two 18-pin terminal blocks on the Interface Board for large branch circuit breakers and/or subfeeds-one for Panelboard A and one for Panelboard B.

The circuit board is marked with a triangle to indicate Pin 1. Pin 1 should be used for the white wire of CT1 (Phase A). The black wire should be connected to Pin 2. The same pattern will follow for the remaining CTs.

After all CTs are installed, use the Configuration tool to label and set alarm parameters. To configure the Liebert LDMF, see **5.5.11 Add a Circuit Breaker**.

If the Power Distribution Center is supplied with optional isolated ground, the isolated ground circuit can be monitored by the Liebert LDMF. Usually the CT is already installed and wired to the Large Branch Terminal Block at the factory. If not, perform the following steps:

(For Isolated Ground CT Installation only)

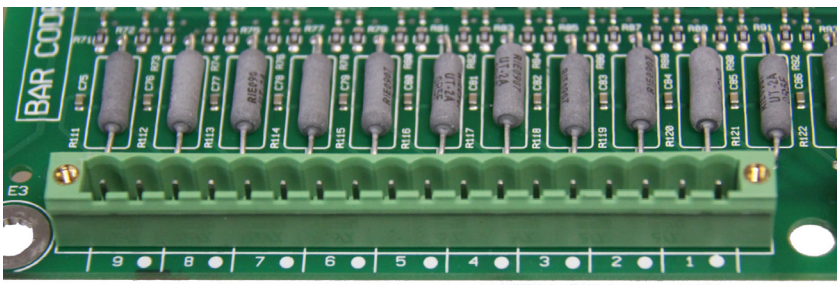
- Connect the isolated ground CT to Pins 17 and 18 on the two 18-pin terminal blocks on the Interface Board.
- Connect the isolated ground CT white wire to Pin 17 and the CT black wire to Pin 18.

Refer to the following example and **Table 2** for wiring configuration details.

Example: When installing a subfeed breaker where the three phases, neutral and ground will be monitored, the CTs should be wired as follows:

Table 2 Large branch breaker CT wiring

Pin	Wiring	
1	Phase A CT	White wire
2	Phase A CT	Black wire
3	Phase B CT	White wire
4	Phase B CT	Black wire
5	Phase C CT	White wire
6	Phase C CT	Black wire
7	Neutral CT	White wire
8	Neutral CT	Black wire
9	Ground CT	White wire
10	Ground CT	Black wire



If a second subfeed or large branch breaker will be installed, the same pattern will continue. Pins 11 and 12 will be Phase A CT for the second breaker, Pins 13 and 14 will be Phase B CT and so on.

Table 3 CT Table for Interface Board

Configuration 1: Four Modules																			
Connector P3 (A)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	CT9 or IG		CT8		CT7		CT6		CT5		CT14		CT3		CT2		CT1	
Connector P4 (B)	**Position**	9	•	8	•	7	•	6	•	5	•	4	•	3	•	2	•	1	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	CT18 or IG		CT17		CT16		CT15		CT14		CT13		CT12		CT11		CT10	

Configuration 2: Two Modules With Large Branch Breaker CT's																			
Connector P3 (A)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	LB9 or IG		LB8		LB7		LB6		LB5		LB4		LB3		LB2		LB1	
Connector P4 (B)	**Position**	9	•	8	•	7	•	6	•	5	•	4	•	3	•	2	•	1	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	LB18 or IG		LB17		LB16		LB15		LB14		LB13		LB12		LB11		LB10	

Configuration 3: Four Modules With Two 5-Wire Subfeed Breaker CT's																			
Connector P3 (A)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT									LB5		LB4		LB3		LB2		LB1	
	Phase	IG								G1		N1		C1		B1		A1	
Connector P4 (B)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT									LB10		LB9		LB8		LB7		LB6	
	Phase	IG								G2		N2		C2		B2		A2	

Configuration 4: Four Modules With Three 5-Wire Subfeed Breaker CT's																			
Connector P3 (A)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT					LB12		LB11		LB5		LB4		LB3		LB2		LB1	
	Phase	IG				G3		N3		G1		N1		C1		B1		A1	
Connector P4 (B)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT			LB13		LB12		LB11		LB10		LB9		LB8		LB7		LB6	
	Phase	IG		C3		B3		A3		G2		N2		C2		B2		A2	

Table 3 CT Table for Interface Board (continued)

Configuration 5: Four Modules With Six 3-Wire Subfeed Breaker CT's																			
Connector P3 (A)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	LB9		LB8		LB7		LB6		LB5		LB4		LB3		LB2		LB1	
	Phase	C3		B3		A3		C2		B2		A2		C1		B1		A1	
Connector P4 (B)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	LB18		LB17		LB16		LB15		LB14		LB13		LB12		LB11		LB10	
	Phase	C6		B6		A6		C5		B5		A5		C4		B4		A4	

Configuration 6: Three Modules With Nine Large Branch Breaker CT's																			
Connector P3 (A)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	LB9 or IG		LB8		LB7		LB6		LB5		LB4		LB3		LB2		LB1	
	Phase	C3		B3		A3		C2		B2		A2		C1		B1		A1	
Connector P4 (B)	**Position**	**9**	•	**8**	•	**7**	•	**6**	•	**5**	•	**4**	•	**3**	•	**2**	•	**1**	•
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	C6		B6		A6		C5		B5		A5		C4		B4		A4	

W = White
B = Black

IG = Isolated Ground CT
LB = Large Branch Breaker CT

A = A Phase CT
B = B Phase CT
C = C Phase CT

N = Neutral CT
G = Ground CT

4.4 Connecting a Current Transformer to the PM4 Large Interface Board (PLIB)

PLIB can monitor eight 4-wire or 5-wire output/subfeed breakers. Two LIB boards are provided to support up to 16 output and/or subfeed breakers. If subfeed breakers are ordered with the unit, the phase CTs are installed and wired to the PLIB. The neutral and ground CTs are also factory-supplied and wired to the PLIB as required.

CTs have a white dot or H1 marking that depicts how to position the CT to ensure accurate readings. The white dot or H1 marking must face toward the load when installing the CT on the ground and neutral cable. The phase CT's are placed in the opposite direction, with the marking faced toward the source. Route the neutral and ground cable through the core of the specified CT and wire-tie the CT to the cable.

If subfeed breakers are installed in the field, up to five CTs may be installed to monitor a subfeed breaker (three phases, neutral and ground). The neutral and ground CTs may be omitted if monitoring of neutral and ground is not required.

The designators on the PLIB are different from those on the Interface Board.

- CT1 (Phase A white wire) begins on TB1 CT1+ and the black wire connects to CT1-.
- The Ground CT for the first subfeed/output circuit breaker connects to TB4 CT35.

The designators on the PLIB are different from those on the Interface Board.

- CT1 (Phase A white wire) begins on TB1 CT1+ and the black wire connects to CT1-.
- The Ground CT for the first subfeed/output circuit breaker connects to TB4 CT35.

First Breaker			Second Breaker		
CT1+	Phase A CT	White wire	CT5+	Phase A CT	White wire
CT1	Phase A CT	Black wire	CT5	Phase A CT	Black wire
CT2+	Phase B CT	White wire	CT6+	Phase B CT	White wire
CT2	Phase B CT	Black wire	CT6	Phase B CT	Black wire
CT3+	Phase C CT	White wire	CT7+	Phase C CT	White wire
CT3	Phase C CT	Black wire	CT7	Phase C CT	Black wire
CT4+	Neutral CT	White wire	CT8+	Neutral CT	White wire
CT4	Neutral CT	Black wire	CT8	Neutral CT	Black wire
CT35+	Ground CT	White wire	CT36+	Ground CT	White wire
CT35	Ground CT	Black wire	CT36	Ground CT	Black wire

If more output or subfeed CTs must be installed, continue in the same pattern shown above.

- Connect the Phase A CT for the second breaker on CT5 (white wire to CT5+, black to CT5-).
- Connect the Ground CT for the second breaker to CT36 (white wire to CT36+, black to CT36-).
- Continue the same pattern until all CT connections are used or there are no more outputs or subfeed CTs to add.

Table 4 CT Table for PM4 Large Interface Board #1

Connector TB1	**PCB Label**	**CT9**		**CT8**		**CT7**		**CT6**		**CT5**		**CT4**		**CT3**		**CT2**		**CT1**	
	Pins	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	CT9		CT8		CT7		CT6		CT5		CT4		CT3		CT2		CT1	
	Phase	A3		N2		C2		B2		A2		N1		C1		B1		A1	

Connector TB2	**PCB Label**	**CT18**		**CT17**		**CT16**		**CT15**		**CT14**		**CT13**		**CT12**		**CT11**		**CT10**	
	Pins	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	CT18		CT17		CT16		CT15		CT14		CT13		CT12		CT11		CT10	
	Phase	B5		A5		N4		C4		B4		A4		N3		C3		B3	

Connector TB3	**PCB Label**	**CT27**		**CT26**		**CT25**		**CT24**		**CT23**		**CT22**		**CT21**		**CT20**		**CT19**	
	Pins	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	CT27		CT26		CT25		CT24		CT23		CT22		CT21		CT20		CT19	
	Phase	C7		B7		A7		N6		C6		B6		A6		N5		C5	

Connector TB4	**PCB Label**	**CT36**		**CT35**		**CT34**		**CT33**		**CT32**		**CT31**		**CT30**		**CT29**		**CT28**	
	Pins	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W					B	W	B	W	B	W	B	W	B	W
	CT	CT2		CT1		NONE		NONE		CT32		CT31		CT30		CT29		CT28	
	Phase	G2		G1						N8		C8		B8		A8		N7	

Connector TB5	**PCB Label**	**CT42**		**CT41**		**CT40**		**CT39**		**CT38**		**CT37**	
	Pins	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W
	CT	CT8		CT7		CT6		CT5		CT4		CT3	
	Phase	G8		G7		G6		G5		G4		G3	

W = White
B = Black

A = A Phase
B = B Phase
C = C Phase

N = Neutral
G = Ground

Table 5 CT Table for PM4 Large Interface Board #2

Connector TB1	**PC Label**	**CT9**		**CT8**		**CT7**		**CT6**		**CT5**		**CT4**		**CT3**		**CT2**		**CT1**	
	Pins	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	CT41		CT40		CT39		CT38		CT37		CT36		CT35		CT34		CT33	
	Phase	A11		N10		C10		B10		A10		N9		C9		B9		A9	

Connector TB2	**PC Label**	**CT18**		**CT17**		**CT16**		**CT15**		**CT14**		**CT13**		**CT12**		**CT11**		**CT10**	
	Pins	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	CT50		CT49		CT48		CT47		CT46		CT45		CT44		CT43		CT42	
	Phase	B13		A13		N12		C12		B12		A12		N11		C11		B11	

Connector TB3	**PC Label**	**CT27**		**CT26**		**CT25**		**CT24**		**CT23**		**CT22**		**CT21**		**CT20**		**CT19**	
	Pins	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W	B	W
	CT	NONE		NONE		NONE		NONE		NONE		NONE		NONE		CT52		CT51	
	Phase															N13		C13	

Connector TB4	**PC Label**	**CT36**		**CT35**		**CT34**		**CT33**		**CT32**		**CT31**		**CT30**		**CT29**		**CT28**	
	Pins	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W					B	W	B	W	B	W	B	W	B	W
	CT	CT10		CT9		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Phase	G10		G9															

Connector TB5	**PC Label**	**CT42**		**CT41**		**CT40**		**CT39**		**CT38**		**CT37**	
	Pins	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
		-	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Wire Color	B	W	B	W	B	W	B	W	B	W	B	W
	CT	NONE		NONE		NONE		CT13		CT12		CT11	
	Phase							G13		G12		G11	

W = White
B = Black

A = A Phase
B = B Phase
C = C Phase

N = Neutral
G = Ground

5.0 OPERATION

The Liebert LDMF is a factory-installed option to provide monitoring of the main breaker, branch circuit breakers and subfeed breakers. It may be installed in the Liebert PPC, Liebert FDC, Liebert FPC. Liebert RX and the Liebert RDC.

Software available on the Liebert Web site (see **5.3 Downloading the Software**) can be installed on a desktop or laptop computer (PC) to monitor status and configure breaker parameters and alarm setpoints. These monitoring and configuration functions are described in **5.4 Using the Monitor Tool (Used Only for Startup and Diagnostics)** and **5.5 Using the Configuration Tool**.

The Liebert LDMF has an optional local display in conjunction with the remote monitoring capability. The display allows end users to view the panelboard main information as well as each individual branch circuit breaker and/or subfeed data. Alarm status may also be viewed from the local display for up-to-date breaker status.

The Liebert LDMF monitors and displays the parameters listed in **Table 6**.

Table 6 Parameters monitored for breakers

Parameters	Displayed and monitored for each:			
	Panelboard branch circuit breaker	Panelboard main circuit breaker and SqD I-Line panelboard	SqD I-Line panelboard circuit breaker	Subfeed circuit breaker
Voltage				
Line-to-line	—	✔	—	—
Line-to-neutral	—	✔	—	—
Phase Current	✔	✔	✔	✔
Neutral Current	—	✔	✔	✔
Ground Current	—	✔	✔	✔
kVA	—	✔	✔	✔
kW	✔	✔	✔	✔
kW-Hours	✔	✔	✔	✔
Percent Load	✔	✔	✔	✔
Power Factor	—	✔	✔	✔
Crest Factor	—	✔	✔	✔
Voltage Total Harmonic Distortion (THD)	—	✔	✔	✔
Current Total Harmonic Distortion (THD)	—	✔	✔	✔

Circuit identification and status of each breaker are also displayed.

NOTE

Before making any changes to an existing configuration or uploading a file to another Liebert LDMF system, make a note of the Software Address. When overwriting an existing configuration file due to changes, modifications or breaker addition/deletion, the Software Address will revert to the value of the file that is loaded. This can lead to incorrect Software Addresses causing Modbus communication errors.

5.1 Alarms

The Liebert LDMF constantly monitors electrical data for each breaker and subfeed. When the unit detects an alarm condition, it annunciates and displays alarm messages via the Monitor program (see **5.4 Using the Monitor Tool (Used Only for Startup and Diagnostics)**) as well as showing the alarm on the local display (if installed).

Alarms must be manually reset after the alarm condition has been corrected and may be reset through Modbus or by pressing the alarm Silence/Reset button on the front display assembly.

To facilitate troubleshooting:

- All alarms are stored in non-volatile memory to protect against erasure by a power outage.

All alarm thresholds for monitored parameters are adjustable by using the Configuration tool to match site requirements (see **5.5 Using the Configuration Tool**).

Table 7 shows the types of alarms for the various types of breakers, along with a description, factory default setpoints and allowable range for each.

Table 7 Alarm conditions and factory setpoints

Alarm	Description	Default setting	Range	Comments
Branch Breakers				
• Overcurrent Warning	Current exceeds 75% of breaker amps	15A	0-200%	0% Disables
• Overcurrent Alarm	Current exceeds 80% of breaker amps	16A	0-200%	—
• Low Current Alarm	Minimum current level of a branch breaker	0% (disables the alarm)	0-70%	—
Panelboard Main Breaker and SqD I-Line Panelboard				
• Phase Overcurrent Warning	Current exceeds 75% of breaker amps	170A	0-200%	0% Disables
• Phase Overcurrent Alarm	Current exceeds 80% of breaker amps	180A	0-200%	—
• Neutral Overcurrent Alarm	Current exceeds 95% of breaker amps	214A	0-200%	—
• Ground Overcurrent Alarm	Current exceeds 5 amps (15-125kVA)	5A	1-100A	—
	Current exceeds 10 amps (150-225kVA)	10A	1-100A	—
	Current exceeds 15 amps (300kVA)	15A	1-100A	—
	Current exceeds 20 amps (450kVA)	20A	1-100A	—
	Current exceeds 25 amps (800kVA)	25A	1-100A	—
• Overvoltage Alarm	At least one of the line-to-line voltages exceeds +6% of nominal	—	0-50%	100% to Disable
• Undervoltage Alarm	At least one of the line-to-line or line-to-neutral voltages falls below -13% of nominal	—	0-50%	100% to Disable
Subfeed Breakers and I-Line Output Breakers				
• Phase Overcurrent Warning	Current exceeds 75% of breaker amps	170A	0-200%	0% Disables
• Phase Overcurrent Alarm	Current exceeds 80% of breaker amps	180A	0-200%	—
• Low Current Warning	Minimum current level of a branch breaker	0% (disables the alarm)	0-70%	—
• Neutral Overcurrent Alarm	Current exceeds 95% of breaker amps		0-200%	—
• Ground Overcurrent Alarm	Current exceeds 5 amps (15-125kVA)	5A	1-100A	—
	Current exceeds 10 amps (150-225kVA)	10A	1-100A	—
	Current exceeds 15 amps (300kVA)	15A	1-100A	—
	Current exceeds 20 amps (450kVA)	20A	1-100A	—
	Current exceeds 25 amps (800kVA)	25A	1-100A	—
Summary Alarm	Detects and annunciates upon occurrence of any alarm	—	—	—
Panelboard Summary Alarm	Detects and annunciates upon occurrence of branch or panelboard main breaker alarm	—	—	—

5.2 Communication

Connecting locally to the Liebert LDMF Monitoring option requires a female-to-female (F-F) DB9 null modem cable. There will be an external port on the Liebert Power product labeled *LDMF SETUP*. Connect the DB9 null modem cable to a local PC. Once connected you may run any of the provided software tools that can be downloaded from the Liebert Web site (see **5.3 Downloading the Software**).

5.2.1 LDMF Setup Port Connection

The local LDMF Setup port is **not** intended to be a service terminal or hyperterminal connection. It is intended only for use of the Liebert LDMF software tools provided.

LDMF SETUP
THE LDMF DOCUMENTATION TOOLKIT WHICH INCLUDES THE USER'S MANUAL, CONFIGURATION SOFTWARE AND MODBUS REGISTRY CAN BE DOWNLOADED AT THE FOLLOWING WEB ADDRESS:
HTTP://WWW.LIEBERT.COM/SERVICESUPPORT_PAGES/SERVICESUPPORT.ASPX?X=SOFTWARE_DOWNLOADS
528046P1 Rev 3

LDMF SETUP
THE LDMF DOCUMENTATION TOOLKIT WHICH INCLUDES THE USER'S MANUAL, CONFIGURATION SOFTWARE AND MODBUS REGISTRY CAN BE DOWNLOADED AT THE FOLLOWING WEB ADDRESS:
HTTP://WWW.LIEBERT.COM/SERVICESUPPORT_PAGES/SERVICESUPPORT.ASPX?X=SOFTWARE_DOWNLOADS
528046P1 Rev 3

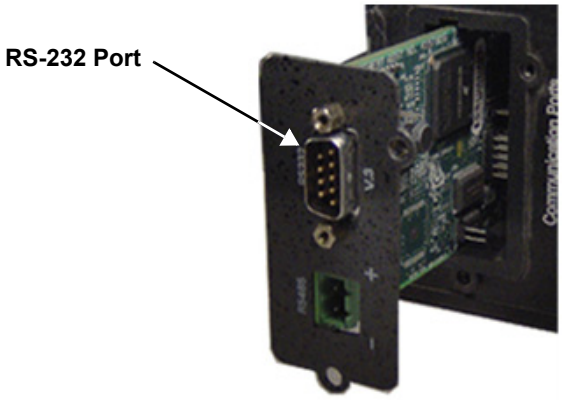
NOTE
The images above are for illustration only. The location of the external port may vary.

5.2.2 Modbus Connection

Use the Modbus port for remote communication. The Liebert LDMF supports two-wire RS-485 and Ethernet connections (customer-installed).

To connect to the Modbus port:

- Look for Connector RS485 on the IntelliSlot IS-485L card for Modbus 485 or IS-IPBMS card for Modbus IP.
- Refer to the following figure for proper connection points.



5.3 Downloading the Software

The Liebert LDMF has three software tools for monitoring, configuration and firmware updates:

- Monitoring - see **5.4 Using the Monitor Tool (Used Only for Startup and Diagnostics)**
- Configuration - see **5.5 Using the Configuration Tool**

These programs may be downloaded at no charge or license fee at the Liebert Web site, **www.liebert.com**. Under **Service and Support**, choose **Software Downloads**.

- Click on the link for the **LDMF - mm/yyyy Toolkit**:
  where **mm/yyyy** is the month and year of the update—for example, 08/2013 or 11/2014

  Note: There are two versions of Liebert Distribution Monitoring software.

  Be sure to select the **LDMF** version, which is for units with a setup port labeled *LDMF Setup*.

  Do NOT choose the Liebert Distribution Monitoring (LDM) Tool Kit. (The LDM Tool Kit is used on units with a setup port labeled *LDM Setup*.)
- Save the file to a computer (PC) and extract the contents.

NOTE

The software may be updated and changed without any notification. Check the Web site regularly to ensure the software is up-to-date.

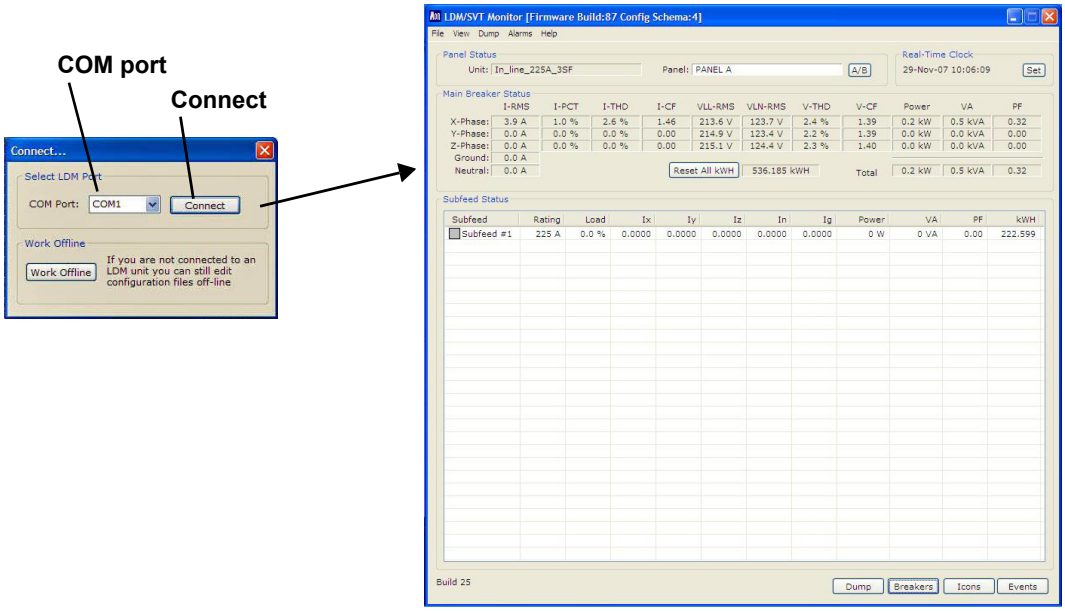
5.4 Using the Monitor Tool (Used Only for Startup and Diagnostics)

The Monitor tool supports a local connection through the LDMF Setup port. The tool displays the following information:

- Main input voltage and currents
- Total power
- Individual branch circuit breaker currents
- System clock (date and time)
- Reset kWh function

5.4.1 Starting the Monitor Tool

- If needed, download the latest version of the software (see **5.3 Downloading the Software**).
- Run the executable file **Monitor-xx.exe** (where **xx** is the latest version) to start the Monitor tool.
- In the Connect window, select the appropriate COM port, shown below left. The dialog box lists available ports only. If a port is in use, it does not appear in the list.
- Click **Connect**.
- The Monitoring main window, below right, opens after communication is established.


COM port
Connect
Connect...
Select LDM Port
COM Port:
COM1
Connect
Work Offline
Work Offline
If you are not connected to an LDM unit you can still edit configuration files off-line
LDM/SVT Monitor [Firmware Build:87 Config Schema:4]
File View Dump Alarms Help
Panel Status
Unit: In_line_225A_3SF
Panel: PANEL A
A/B
Real-Time Clock
29-Nov-07 10:06:09
Set
Main Breaker Status
I-RMS I-PCT I-THD I-CF VLL-RMS VLN-RMS V-THD V-CF Power VA PF
X-Phase: 3.9 A 1.0 % 2.6 % 1.46 213.6 V 123.7 V 2.4 % 1.39 0.2 kW 0.5 kVA 0.32
Y-Phase: 0.0 A 0.0 % 0.0 % 0.00 214.9 V 123.4 V 2.2 % 1.39 0.0 kW 0.0 kVA 0.00
Z-Phase: 0.0 A 0.0 % 0.0 % 0.00 215.1 V 124.4 V 2.3 % 1.40 0.0 kW 0.0 kVA 0.00
Ground: 0.0 A
Neutral: 0.0 A
Reset All kWH
536.185 kWH
Total 0.2 kW 0.5 kVA 0.32
Subfeed Status
Subfeed Rating Load Ix Iy Iz In Ig Power VA PF kWH
Subfeed #1 225 A 0.0 % 0.0000 0.0000 0.0000 0.0000 0.0000 0 W 0 VA 0.00 222.599
Build 25
Dump Breakers Icons Events

5.4.2 Monitor Menu Options

The Monitor window has a menu bar at the top with a drop-down list of options for each menu. **Table 8** summarizes the options available in these menus.

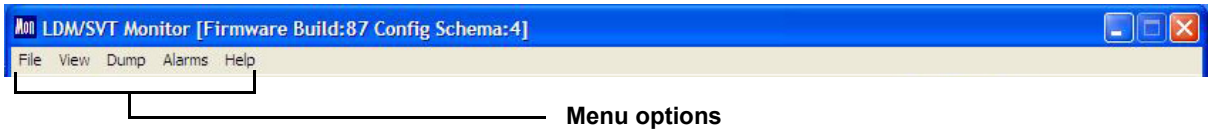


Table 8 Monitor Menu Options

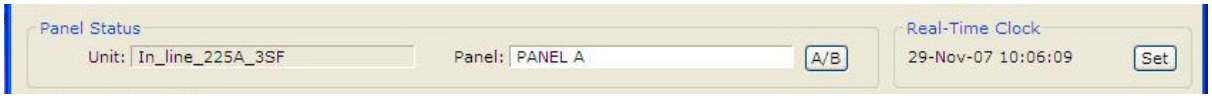
Menu Option	Function
File Menu	
• Exit	Terminates the monitoring session and closes the Monitor program.
View Menu	
• Breakers	Updates the status of all branch breakers for the selected panel in the Breaker Status area.
• Subfeeds	Updates the status of all subfeed breakers for the selected panel in the Breaker Status area.
Alarms Menu Choose one of three options—Raw, Filtered or Latched—to specify how alarms are displayed. Note that alarms sent over Modbus are latched independent of changes performed in the Alarms menu.	
• Raw	The raw alarm state is the instantaneous state of the alarm. It is not filtered and has no hysteresis. When **Raw** is selected, an alarm is active whenever the latest reading exceeds the set point and is cleared as soon as the reading returns to a level within the set point range.
• Filtered	The filtered alarm uses the hysteresis interval to suppress transient alarms. A filtered alarm is cleared after the alarm condition remains cleared for longer than the hysteresis interval.
• Latched	Latched alarms behave like filtered alarms that get stuck on. A latched alarm stays active until the alarm is manually cleared.
• Clear All	Clears all latched alarms for the selected panel. Any alarm condition that is still active is latched again after the hysteresis interval passes.
Help Menu	
• About	Displays information about Liebert Distribution Monitoring.

5.4.3 Panel Status and Real-Time Clock

The Panel Status area displays:

- The name of the Liebert LDMF in the Unit box.
- The currently selected panel in the Panel box.

  To choose a different panel, click on the panel name or the **A/B** button. If the selected panel has any active alarms, the panel name appears in white text with a red background.

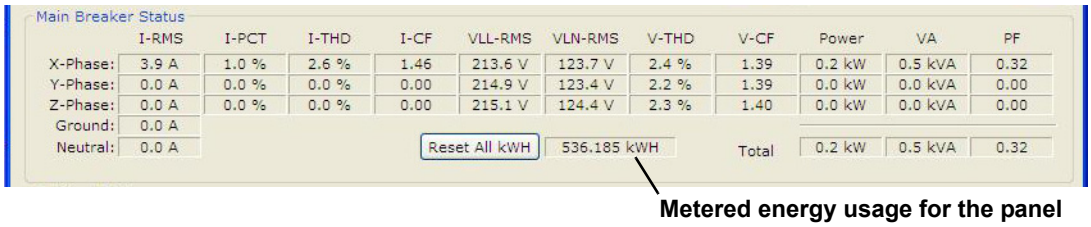


The Real-Time Clock displays the time as stored in the Liebert LDMF unit. The time will not display correctly if the time zone is incorrect in the PC. If the time displayed is incorrect and the problem is not caused by a time-zone configuration problem:

- Click the **Set** button to force the real-time clock to synchronize with the time set on the PC.

5.4.4 Main Breaker Status

The Main Breaker Status area displays RMS current, percent load (PCT), total harmonic distortion (THD), crest factor (CF), line-to-line voltage (VLL-RMS), line-to-neutral voltage (VLN-RMS), average power (Power), VA and power factor (PF) for each input phase. If any phase voltage or current is in alarm, the associated field displays white text with a red background.


Main Breaker Status
I-RMS I-PCT I-THD I-CF VLL-RMS VLN-RMS V-THD V-CF Power VA PF
X-Phase: 3.9 A 1.0 % 2.6 % 1.46 213.6 V 123.7 V 2.4 % 1.39 0.2 kW 0.5 kVA 0.32
Y-Phase: 0.0 A 0.0 % 0.0 % 0.00 214.9 V 123.4 V 2.2 % 1.39 0.0 kW 0.0 kVA 0.00
Z-Phase: 0.0 A 0.0 % 0.0 % 0.00 215.1 V 124.4 V 2.3 % 1.40 0.0 kW 0.0 kVA 0.00
Ground: 0.0 A
Neutral: 0.0 A
Reset All kWH
536.185 kWH
Total 0.2 kW 0.5 kVA 0.32
Metered energy usage for the panel

The metered energy usage for the panel is also displayed in kilowatt hours (kWh), as shown above. To clear all metering information, click the **Reset All kWh** button.

CAUTION

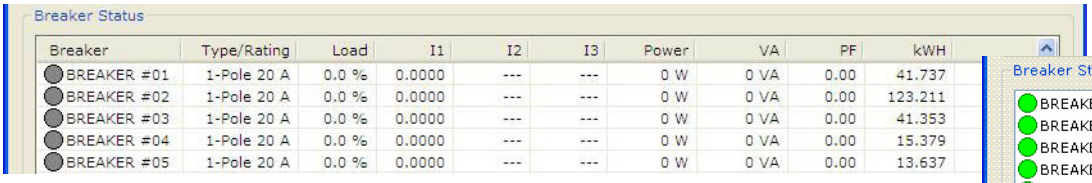
Exercise care before using the **Reset All kWh** button, which resets the kWh usage for the main breaker as well as all branch breakers and subfeed breakers on the panel.

5.4.5 Breaker Status

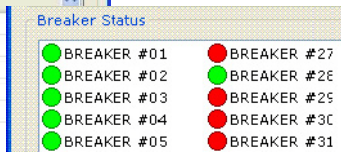
The Breaker Status area displays detailed status for every branch or subfeed breaker on the selected panel. The information may appear in table format or in a list with icons indicating status, depending on whether the **Table** or **Icons** button is active (see **5.4.6 Mode Buttons**).

The example below left shows the table format with details for each branch breaker: type and rating, percent load, individual phase current in amps (I1, I2, I3), power, apparent power (VA), power factor (PF) and accumulated kilowatt hours (kWh). The example below right shows the icon format.

Table view of breaker status


Breaker Status
Breaker Type/Rating Load I1 I2 I3 Power VA PF kWH
BREAKER #01 1-Pole 20 A 0.0 % 0.0000 --- --- 0 W 0 VA 0.00 41.737
BREAKER #02 1-Pole 20 A 0.0 % 0.0000 --- --- 0 W 0 VA 0.00 123.211
BREAKER #03 1-Pole 20 A 0.0 % 0.0000 --- --- 0 W 0 VA 0.00 41.353
BREAKER #04 1-Pole 20 A 0.0 % 0.0000 --- --- 0 W 0 VA 0.00 15.379
BREAKER #05 1-Pole 20 A 0.0 % 0.0000 --- --- 0 W 0 VA 0.00 13.637

Icon view of breaker status



5.4.6 Mode Buttons

Mode buttons at the bottom of the window allow users to toggle the Breaker Status display between subfeed and branch breakers (**Subfeeds/Breakers**) or between icon and table formats (**Icons/Table**) and access the Event Log (**Events**).

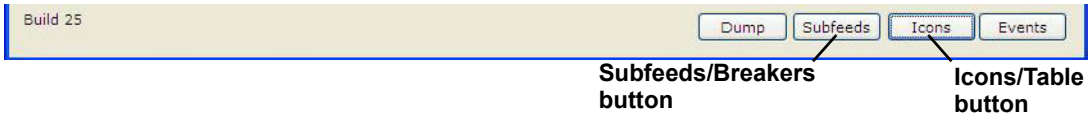


Table 9 Monitor mode buttons

Button	Function
Subfeeds/ Breakers	Toggles between component types in the Breaker Status area: subfeed breakers and branch breakers. The button label changes when the display is changed.
Icons/ Table	Toggles between formats for displaying data in the Breaker Status area: icon view and table view. The button label changes when the display is changed.
Events	Displays the Event Log dialog box.

5.5 Using the Configuration Tool

The Configuration tool allows users to set up breakers and view or change their parameters and alarm setpoints.

NOTE

*End users have the ability to modify an existing configuration file by using the Configuration software available on the Liebert Web site, **www.liebert.com** (see **5.3 Downloading the Software**). Ensure the existing configuration file is saved locally before making any modifications. Please contact your local Emerson Network Power® representative or call* Emerson Network Power® Liebert Services *at 1-800-LIEBERT (1-800-543-2378) for assistance.*

5.5.1 Starting the Configuration Program

Before starting the Configuration tool, decide whether you want to connect to the Liebert LDMF or work in offline mode.

Offline mode allows you to run the configuration tool without being connected to the equipment.

NOTE

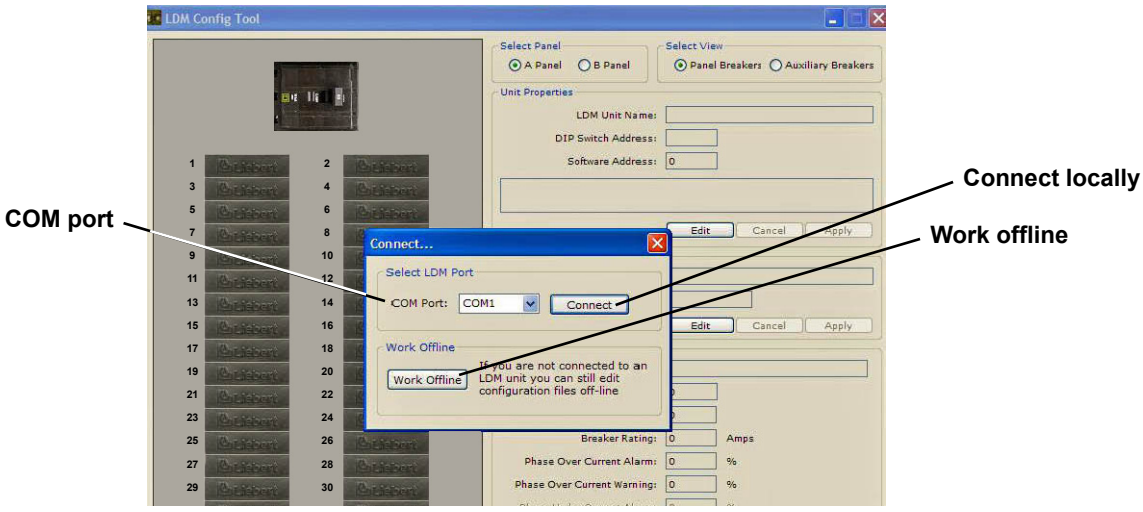
*A configuration file is required for Offline Mode. If one is not available, connect to the equipment locally and save the configuration to disk. See **5.5.4 Install Configuration Changes in the Unit** and **5.5.5 Save the Configuration File to Disk**.*

To Connect via COM Port

1. If needed, download the latest version of the software (see **5.3 Downloading the Software**).
2. Connect a PC to the Liebert LDMF via the external DB9 connection. Refer to **5.2.1 LDMF Setup Port Connection**.
3. Run the file **LDMF-Config-xx.exe** (where **xx** is the version number) to start the Configuration program.
4. In the Connect window, select the appropriate COM port from the list of available ports.
5. Click **Connect**.

To Work in Offline Mode

1. If needed, download the latest version of the software (see **5.3 Downloading the Software**).
2. Run the file **LDMF-Config-xx.exe** (where **xx** is the version number) to start the Configuration program.
3. In the Connect window, click the **Work Offline** button, shown below.
4. When prompted for the configuration file, navigate to the location of the file.
5. Click **Open**.



Proceed to **5.5.2 Main Configuration Window Overview** to begin configuration.

When a local connection to the Liebert LDMF can be performed, load the configuration using the instructions in **5.5.3 Load a Configuration File from Disk**.

5.5.2 Main Configuration Window Overview

The Configuration window shows breakers graphically in the left pane and associated breaker data at right. Selecting a breaker in the left pane changes the display of data in the right pane.

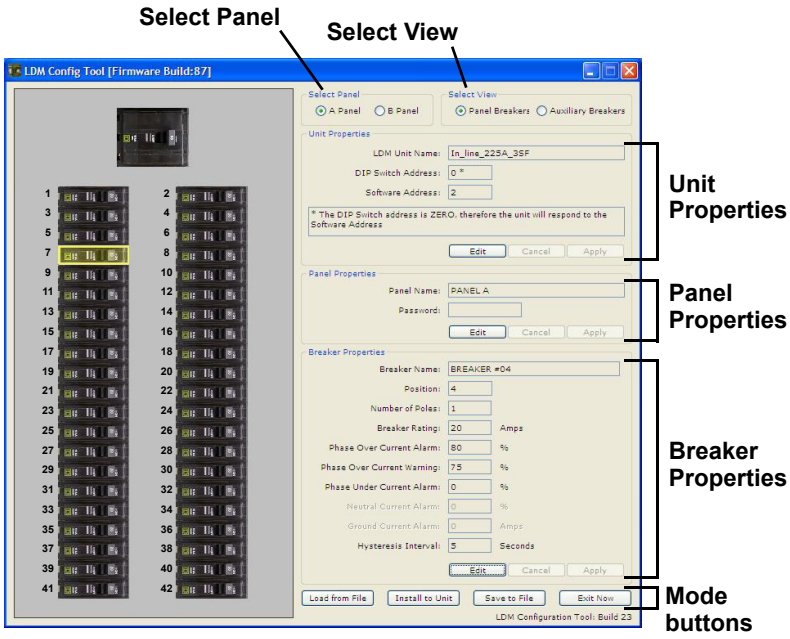


Table 10 shows the main sections of the window, along with a description and a reference to step-by-step instructions for each.

Table 10 Overview of main Configuration window

Section	Function	For details, see:
Select Panel	Toggles the display between Panel A and Panel B.	**5.5.6 Select Panel to View**
Select View	Toggles between Panel and Auxiliary Breakers.	**5.5.7 Select Breakers to View**
Unit Properties	Displays the name and communication settings of the Liebert LDMF unit.	**5.5.8 Edit the Liebert LDMF Unit Properties**
Panel Properties	Displays the name of the selected panelboard; also password setup for security purposes.	**5.5.9 Edit the Panel Properties or Set a Password**
Breaker Properties	Displays breaker parameters and alarm setpoints.	**5.5.10 Edit the Breaker Properties**
Configuration Mode Buttons		
• Load from File	Uploads a saved configuration file from the PC to the Liebert LDMF. This feature may be used to install a backup copy of a configuration file or set up a new Liebert LDMF installation.	**5.5.3 Load a Configuration File from Disk**
• Install to Unit	Uploads the current configuration from the PC to the Liebert LDMF after making changes to the configuration. This step is required to update the unit with the latest changes.	**5.5.4 Install Configuration Changes in the Unit**
• Save to File	Saves a copy of the configuration file to the PC. This feature is useful when a backup copy of the configuration file is needed.	**5.5.5 Save the Configuration File to Disk**
• Exit Now	Closes the Configuration program.	—

5.5.3 Load a Configuration File from Disk

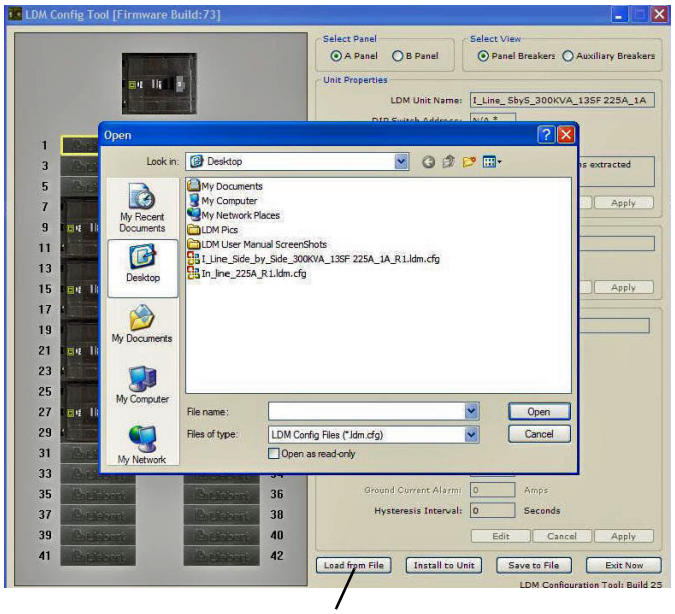
A previously saved configuration file—created by Emerson Network Power technical personnel or saved from a Liebert LDMF unit—may be transferred from a PC to the Liebert LDMF.

This feature allows for quick setup based on another unit's configuration or replacing a configuration file in an existing installation.

To upload the configuration file:

- Click on the **Load from File** button at the bottom of the Configuration window.
- In the Open window, navigate to the configuration file, then click **Open**.

After a short delay, a confirmation message appears. The Liebert LDMF is now updated with all breaker and subfeed data from the configuration file that was just loaded.



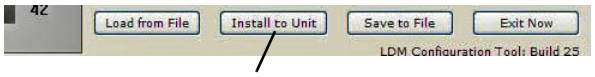
Load from File

5.5.4 Install Configuration Changes in the Unit

Whenever configuration changes are made using the Configuration program, the changes must be installed in the Liebert LDMF using this procedure.

To install changes in the unit:

1. Click on the **Install to Unit** button at the bottom of the Configuration window.
2. During the upload, the circuit board will reboot and cause a loss of communication with the monitoring products.



Install to Unit

Once the rebooting process is complete, the configuration is active.

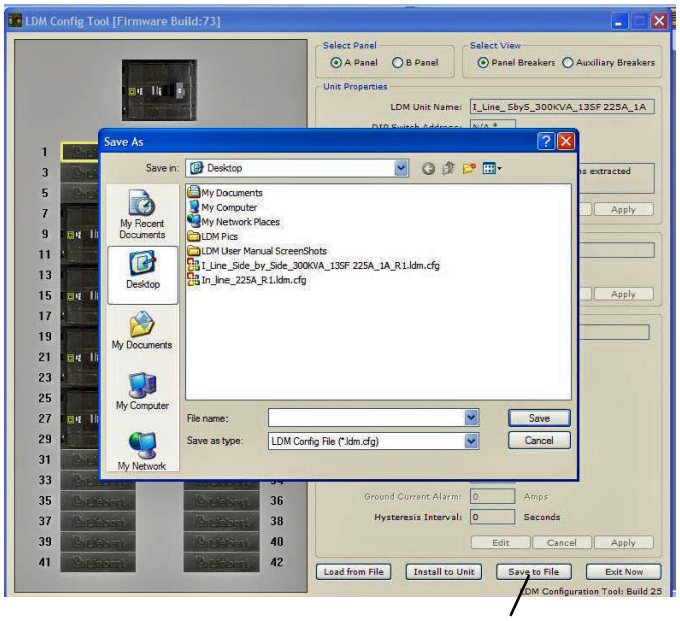
NOTE

*Configuration changes are not stored in the Liebert LDMF until the **Install to Unit** button is clicked.*

5.5.5 Save the Configuration File to Disk

Saving the configuration file creates a copy of the current configuration, ensuring a backup is available in the event of file corruption or some other problem.

- Click on the **Save to File** button at the bottom of the Configuration window.
- In the Save As window:
  - Specify the location where you want to save the file in the Save In box.
  - Enter a unique name in the File Name box.
  - Click **Save**.



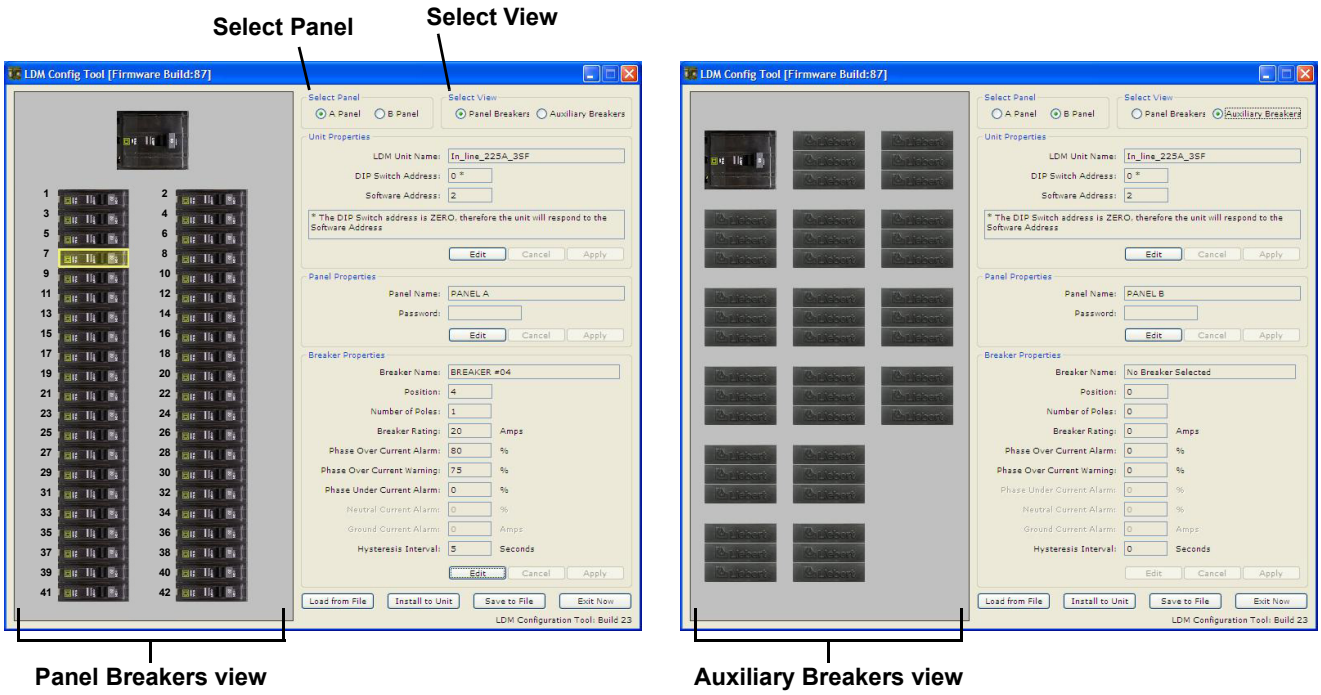
Save to File

5.5.6 Select Panel to View

Up to two panelboards may be connected to the Liebert LDMF (see **4.1.1 Connecting Panelboards A and B**). Each may be viewed in the Configuration main window.

To switch the view to a different panel:

- In the Select Panel box, click on **Panel A** for Panelboard A or **Panel B** for Panelboard B. The panel name appears in the Panel Name box, as in the following examples.



5.5.7 Select Breakers to View

For each panelboard, two types of breakers may be configured.

To switch the view, click on a button in the Select View box (shown above):

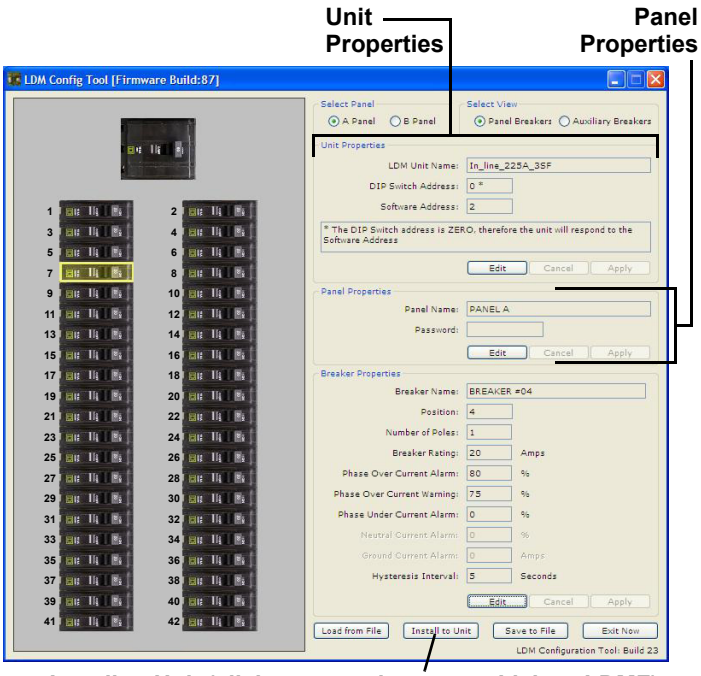
- **Panel Breakers** to view circuit breakers installed in the panelboard (see example above left).
- **Auxiliary Breakers** to view breakers installed outside the panelboard—for example, subfeed breakers (see example above right).

5.5.8 Edit the Liebert LDMF Unit Properties

The Unit properties box displays the name and software address of the Liebert LDMF unit:

- **LDMF Unit Name** - a name assigned to the Liebert LDMF unit.
  To make a change, click **Edit** and enter a name, then click **Apply**.
- **Software Address** - the address is configured using the communication configuration tool.
- When finished, click **Install to Unit** to upload the changes to the Liebert LDMF.

NOTE
*The configuration changes will not be stored in the Liebert LDMF until the **Install to Unit** button is clicked.*



5.5.9 Edit the Panel Properties or Set a Password

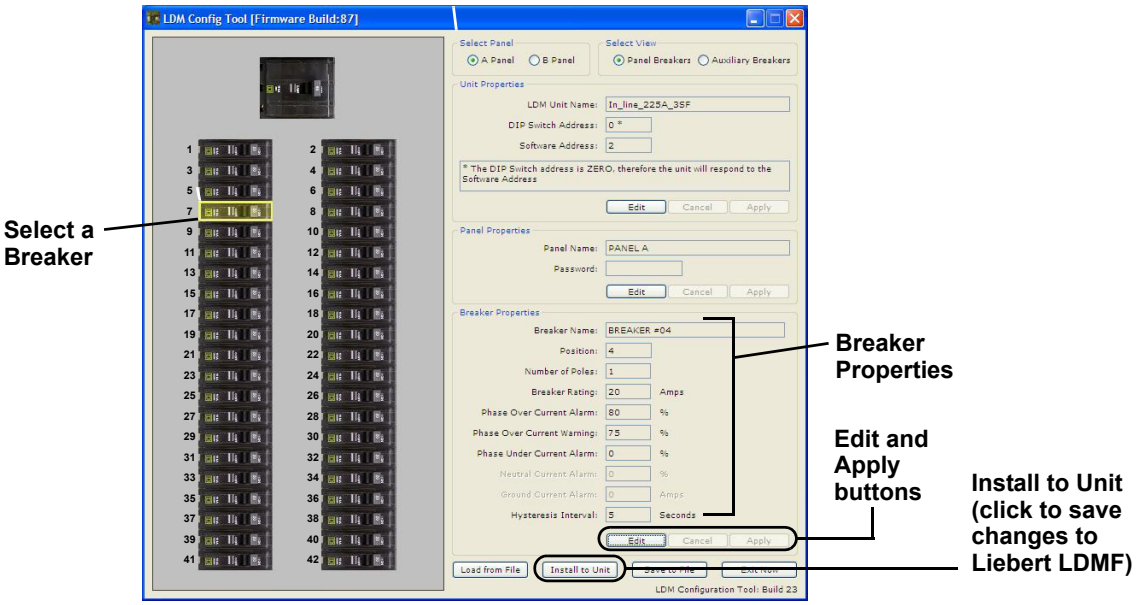
The Panel Properties box (see image above) displays the name of the selected panelboard, as well as a Password box for creating a password to protect against unwarranted changes to the configuration:

- **Panel Name** - the default panelboard names are PANEL A and PANEL B.
  To change a name, click **Edit** and enter a name, then click **Apply**.
- **Password** - a password required for users to make changes to the configuration file.
  To create a password:
  - Click in the Password box, click **Edit** and enter a password.
    The password may be up 10 characters long and may consist of any combination of numbers, letters and special characters. The password is not case-sensitive.
  - Click **Apply**.
- When finished, click Install to Unit to upload the changes to the Liebert LDMF.

NOTE
*The configuration changes will not be stored in the Liebert LDMF until the **Install to Unit** button is clicked.*

5.5.10 Edit the Breaker Properties

The Breaker Properties box displays the breaker name, rating, breaker parameters and alarm settings.


Select a Breaker
LDM Config Tool [Firmware Build:87]
Breaker Properties
Edit and Apply buttons
Install to Unit (click to save changes to Liebert LDMF)

To view or change parameters and alarm settings of a breaker:

- Click on the breaker in the left pane. When selected, the breaker has a yellow outline.
- Refer to **Table 11** to make changes:

Table 11 Edit breaker properties and description

Parameter	Description	To make a change:
Breaker Name	The name of the selected breaker. The default names are BREAKER #01, BREAKER #02, etc.	• Click in the Breaker Name box, click **Edit** and enter a name, then click **Apply**.
Position	The location of the selected breaker on the panelboard.	(Cannot be edited)
Number of Poles	The number of poles selected when the breaker was added to the panelboard.	(Cannot be edited)
Breaker Rating	The amperage for which the circuit breaker is rated. The default is 20A.	• Click in the Breaker Rating box, click **Edit** and enter a value, then click **Apply**.
Phase Overcurrent Alarm	Percentage of the breaker rating that triggers an overcurrent alarm. This value must be higher than the Phase Overcurrent Warning.	• Click in the Phase Overcurrent Alarm box, click **Edit** and enter a value, then click **Apply**.
Phase Overcurrent Warning	Percentage of the breaker rating that triggers an overcurrent warning. This value must be lower than the Phase Overcurrent Warning.	• Click in the Phase Overcurrent Warning box, click **Edit** and enter a value, then click **Apply**.
Phase Undercurrent Alarm	Percentage of the breaker rating that triggers an undercurrent alarm. The default is 0 (zero), which disables the alarm.	• Click in the Phase Undercurrent box, click **Edit** and enter a value, then click **Apply**.
Neutral Current Alarm	Percentage of the breaker that triggers a neutral current alarm.	• Click in the Neutral Current Alarm box, click **Edit** and enter a value, then click **Apply**.
Ground Current Alarm	Amperage that triggers a ground current alarm.	• Click in the Ground Current Alarm box, click **Edit** and enter a value, then click **Apply**.

NOTE

*The configuration changes will not be stored in the Liebert LDMF until the **Install to Unit** button is clicked.*

5.5.11 Add a Circuit Breaker

After having an electrician physically install a circuit breaker(s) in the panelboard, use the Configuration software to add the new breaker to the configuration file.

Run the configuration program using the steps outlined in **5.5.1 Starting the Configuration Program**. Once connected, the configuration file that is currently programmed will be displayed.

NOTE

*It is highly recommended to save the configuration file to the local PC as a backup prior to making any changes to the configuration file. Perform the steps outlined in **5.5.5 Save the Configuration File to Disk** before proceeding.*

NOTE

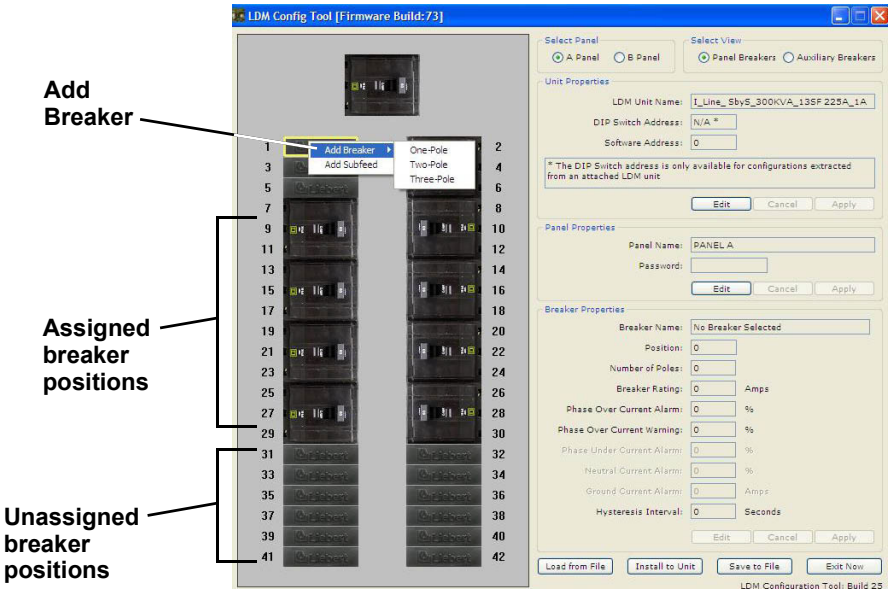
*Check to make sure the location for the new breaker does NOT have a breaker already assigned. If it does, first remove that breaker assignment (see **5.5.13 Delete a Circuit Breaker/Subfeed Breaker**), then return to this procedure.*

An error message appears if you attempt to add a breaker to an assigned position.

- *If NOT assigned, a breaker position is shown with a Liebert logo.*
- *An assigned breaker position appears as a picture of a circuit breaker.*

To add a 1-, 2- or 3-pole circuit breaker:

- Run the Configuration program (see **5.5.1 Starting the Configuration Program**).
- If needed, select the panel and breaker view with the new breaker:
  - In the Select Panel box, click on **Panel A** or **Panel B** depending on the panelboard where the new breaker was added.
  - In the Select View box, choose **Panel Breakers** if the new breaker is installed inside the panelboard (branch breaker) or **Auxiliary Breakers** if located outside the panelboard (subfeed/output breaker).



- Right-click on the new breaker position in the left pane. The selected breaker has a yellow outline.
- In the pop-up menu, click on **Add Breaker** and then click on the type of breaker that was installed: **One-Pole**, **Two-Pole** or **Three-Pole**.
- In the Breaker Properties at right, change the breaker's name, parameters and alarm settings as needed (see **5.5.10 Edit the Breaker Properties**).
- When finished, click **Install to Unit** to upload the changes to the Liebert LDMF.

NOTE

*The configuration changes will not be stored in the Liebert LDMF until the **Install to Unit** button is clicked.*

5.5.12 Adding a Subfeed Breaker

NOTE

*Check to make sure the location for the new breaker does NOT have a breaker already assigned. If it does, first remove that breaker assignment (see **5.5.13 Delete a Circuit Breaker/Subfeed Breaker**), then return to this procedure.*

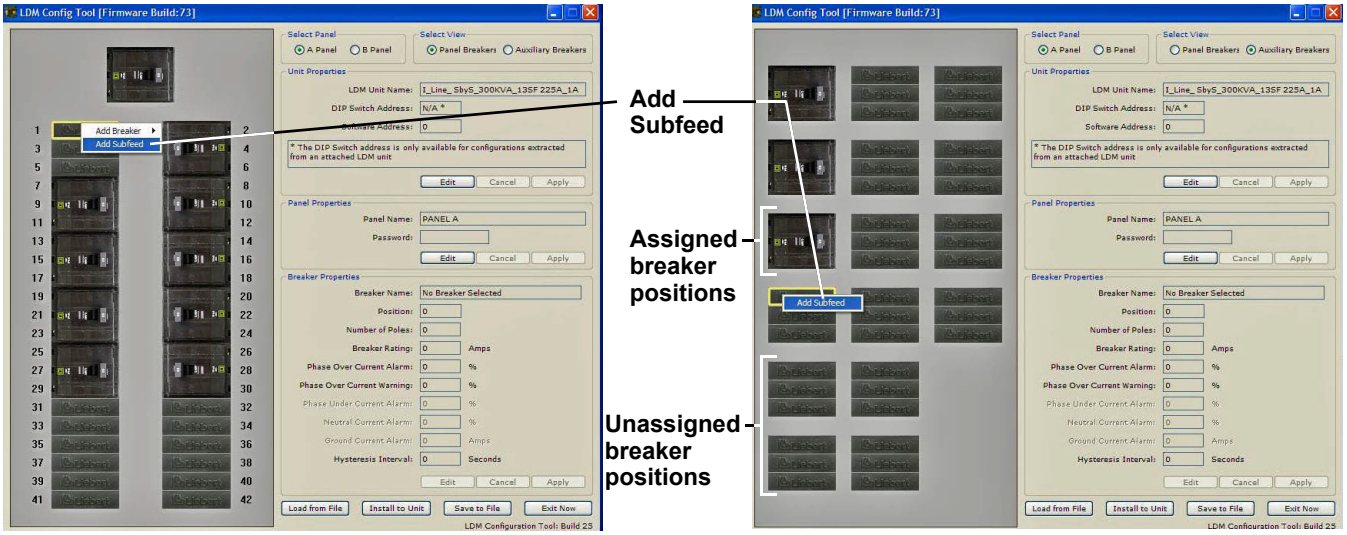
An error message appears if you attempt to add a breaker to an already assigned position.

- *If NOT assigned, a subfeed breaker position is shown with three Liebert logos.*
- *An assigned subfeed breaker position appears as a picture of a 3-pole breaker.*

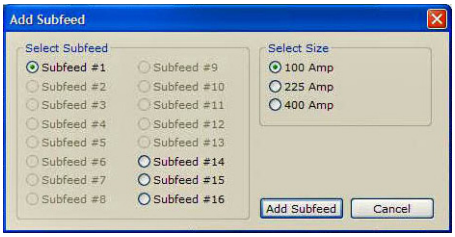
To add a 3-pole subfeed breaker circuit:

- Run the Configuration program (see **5.5.1 Starting the Configuration Program**).
- If needed, select the panel and breaker view with the new breaker:
  - In the Select Panel box, click on **Panel A** or **Panel B**.
  - In the Select View box, choose **Panel Breakers** if the new breaker is installed inside the panelboard or **Auxiliary Breakers** if located outside the panelboard.

Panel Breaker View **Auxiliary Breaker View**



- Right-click on the new breaker position in the left pane. The selected breaker has a yellow outline.
- In the pop-up menu, click on **Add Subfeed**.
- In the Add Subfeed window:
  - Click on the subfeed—for example, **Subfeed #1** or **Subfeed #2**—in the Select Subfeed box.



NOTE

The number of available subfeeds is determined by the interface board selected and whether cross-configuration is enabled.

  - In the Select Size box, choose the rating of the new breaker: **100 Amp**, **225 Amp** or **400 Amp**.
  - Click on the **Add Subfeed** button to return to the main Configuration window.
- In the Breaker Properties box of the Configuration window, change the subfeed breaker's name, parameters and alarm setpoints as needed (see **5.5.10 Edit the Breaker Properties**).
- When finished, click **Install to Unit** to upload the changes to the Liebert LDMF.

NOTE

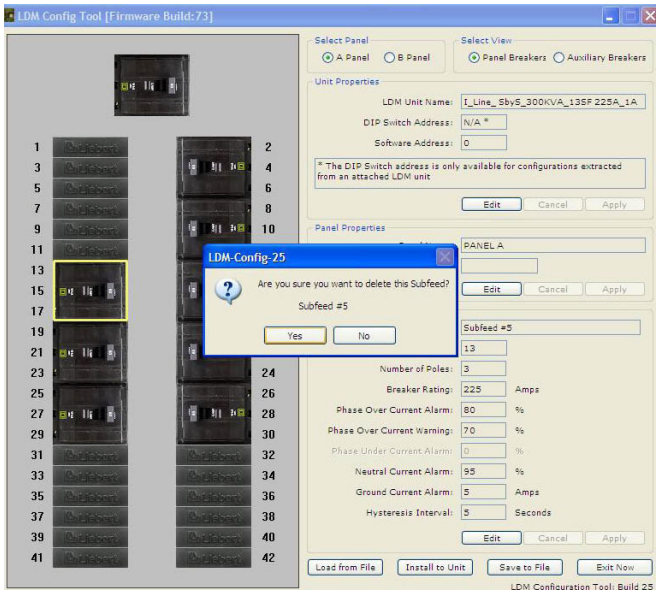
*The configuration changes will not be stored in the Liebert LDMF until the **Install to Unit** button is clicked.*

5.5.13 Delete a Circuit Breaker/Subfeed Breaker

Removing a breaker from the configuration is required after moving or removing circuit breakers in the panelboard. This step must be performed before adding a breaker in the same position.

To delete a breaker:

- Run the Configuration program (see **5.5.1 Starting the Configuration Program**).
- If needed, select the panel and breaker view with the breaker to be deleted:
  - In the Select Panel box, click on **Panel A** or **Panel B**.
  - In the Select View box, choose **Panel Breakers** if the breaker is installed inside the panelboard or **Auxiliary Breakers** if located outside the panelboard.



- Right-click on the breaker position in the left pane. The selected breaker has a yellow outline.
- In the pop-up menu, click **Delete**.
- A confirmation message appears, as shown above. Select **Yes** to delete the breaker (or **No** to cancel).
- Repeat as needed to delete other breakers.
- When finished, click **Install to Unit** to upload the changes to the Liebert LDMF.

NOTE

*The configuration changes will not be stored in the Liebert LDMF until the **Install to Unit** button is clicked.*

5.6 Upgrading the Firmware

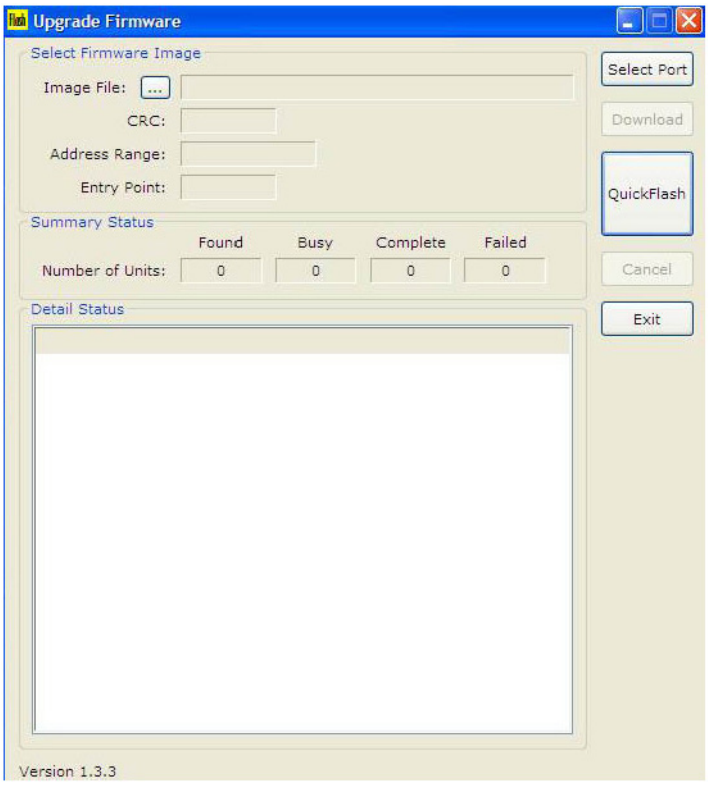
The Flash program is used to upgrade the firmware on a Liebert LDMF unit. It uses the service terminal port to erase the old firmware, copy the new firmware and reboot the unit.

NOTE

Updating the firmware will not erase any configuration settings currently installed. Installing a new configuration file will overwrite the Modbus address and settings.

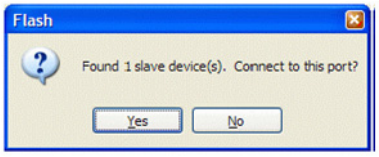
To upgrade the firmware:

1. Make sure the Liebert LDMF unit is powered ON.
2. Connect the PC to the Liebert LDMF via the external DB9 connection. Refer to **5.2.1 LDMF Setup Port Connection**.
3. Run the file named **Flash-x.x.x.exe** (where **x.x.x** is the version number).
4. In the Upgrade Firmware window, click the **Select Port** button.



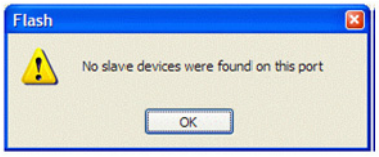
5. In the Scan for LDM Units window:
   - Select the COM port from the drop-down list—for example, **COM1**.
   - Make sure the Baud Rate is **115200**.
   - Click the **Start Scan** button to check for a connection to the unit.

6. If the Liebert LDMF unit is detected, a confirmation window appears. Click **Yes** to continue and proceed to **Step 7**.

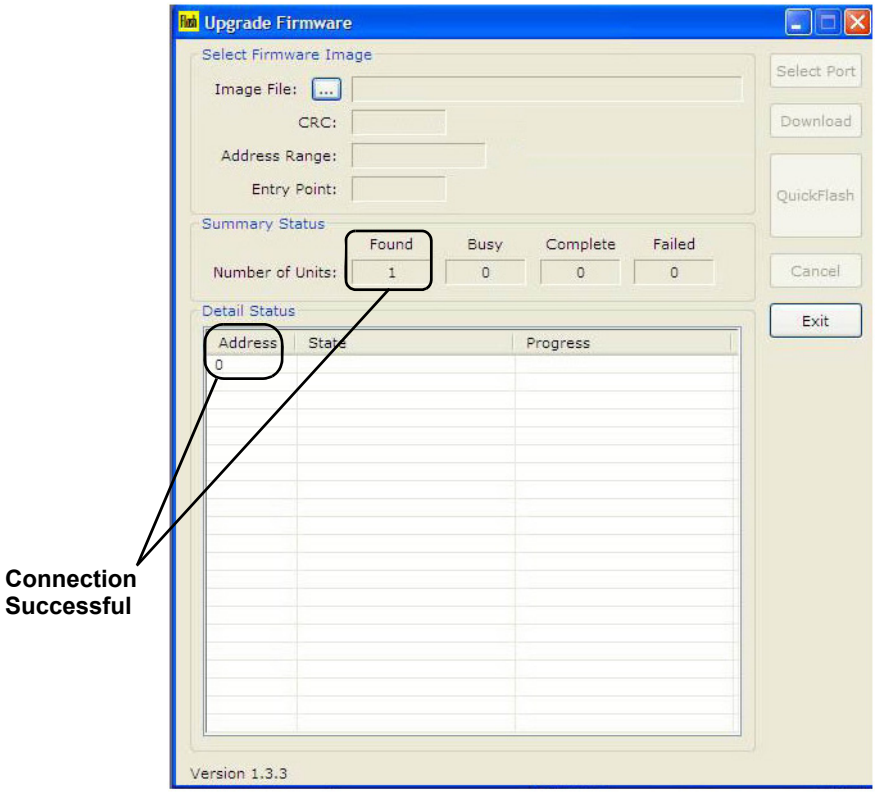


If the Liebert LDMF unit is NOT detected, an error message appears. Click **OK** to return to the Upgrade Firmware window. Check to verify the following, then repeat **Step 5**:

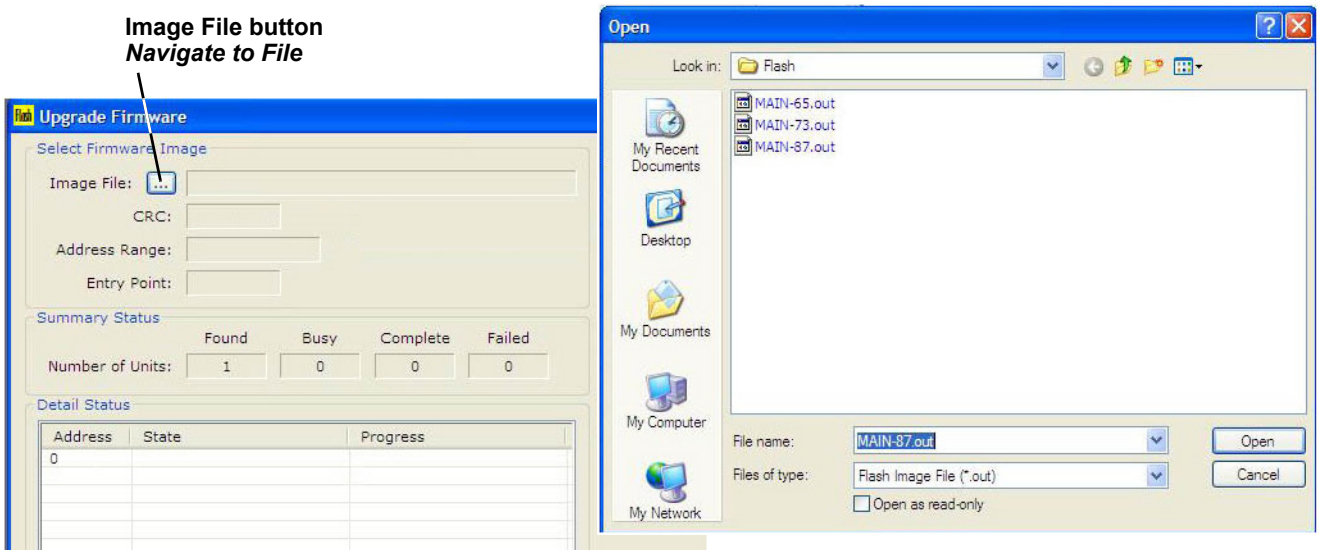
- The correct COM Port is selected and the Baud Rate is 115200.
- A serial cable is properly connected to the unit (see **5.2.1 LDMF Setup Port Connection**).
- The Liebert LDMF unit is powered ON.



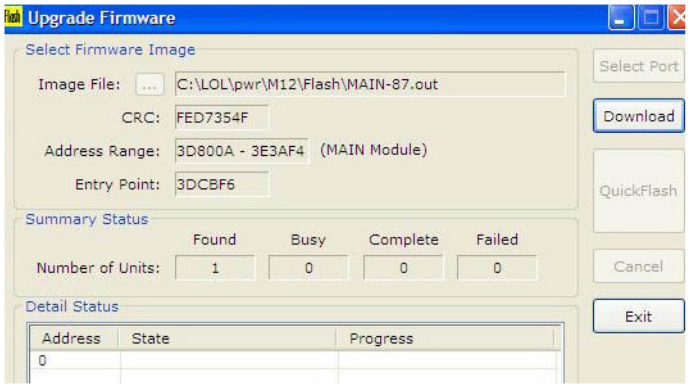
7. Verify the Upgrade Firmware window displays the following indications that the connection was successful (shown in the example below):
   - In the Summary Status box, the Number of Units should be **1** in the Found box.
   - In the Detail Status box, **0** should appear in the Address column.
   - The **Select Port**, **Download**, **Quick Flash**, and **Cancel** buttons are grayed-out



8. Click the **Image File** button [...] (below left), and the Open window appears (below right).
   - Browse to the folder where the Flash files are located—this should be the same folder where the Flash Program was installed.
   - Select the file you want to download.
   - Click the **Open** button.

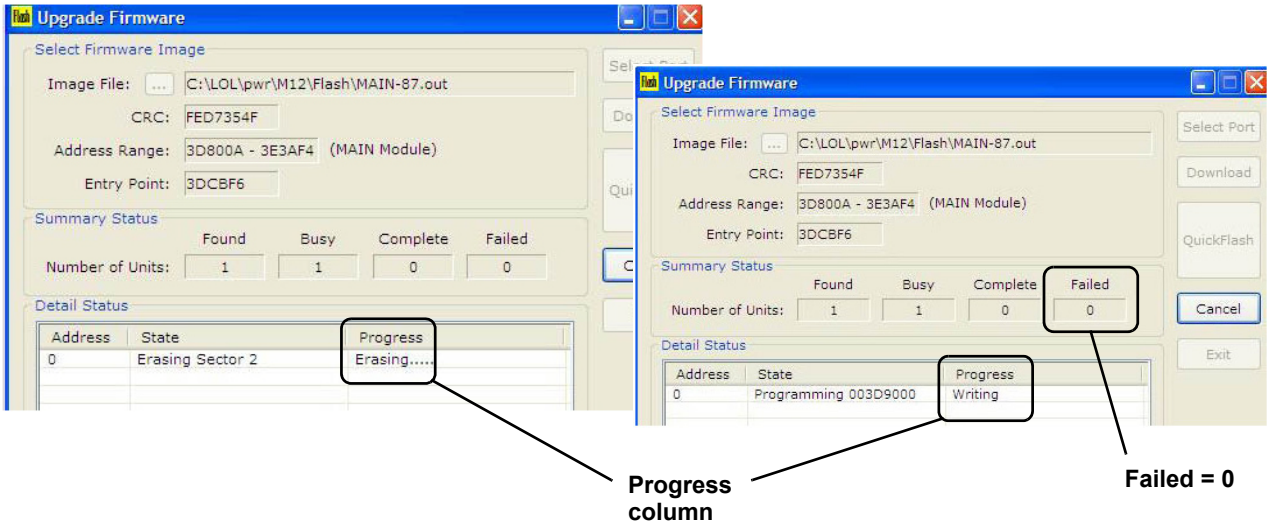


9. The Upgrade Firmware window appears. Click the **Download** button to continue.



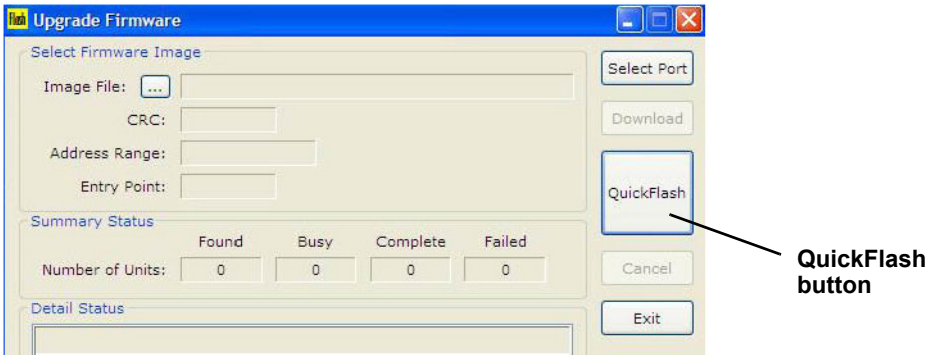
10. Wait for the firmware upgrade to complete. The Progress column in the Detail Status Area shows the status of the upgrade.

    The program erases the old image (below left), than writes the new image (below right).



11. When the new image is loaded, the Flash program restarts the unit. Verify the following:
    - In the Summary Status box, the Number of Units should be **0** under Failed (above right).
    - In the Detail Status box, **Running** should appear in the Progress column—this indicates that the BCB has been restarted successfully.
12. The Flash program has a Quick Flash feature that keeps track of where the file is stored on the local PC. This feature becomes active after the initial firmware update has been completed. This makes upgrading numerous LDMF Systems easier and less time-consuming.

    Connect to each additional LDMF System, then click on the **QuickFlash** button to begin the update automatically without having to specify the file location.



13. Once all LDMF Systems have been upgraded, click **Exit** to close the Flash program.

5.7 Display Controls (HMI)

The Liebert LDMF displays panelboard data via a local display in conjunction with the remote capabilities. This display gives the end user a quick and easy way of viewing the panelboard branch circuit breaker currents, panelboard voltages, alarms and status. An audible alarm is also provided in the event that any programmed alarm threshold is exceeded.

The user interface and menu selections have been developed to make it easy to scroll through panelboard data points with clearly labeled variable function keys. These function keys change features depending on the menu selected to maintain a clearly visible view area.

There can be up to two HMI's on a unit and each can display up to four panelboards.

5.7.1 Controls and Indicators

The left side of the display includes indicators and an alarm speaker:

- **Power Indicator (Green LED)** - illuminates when power has been applied to the Liebert Power product.
- **Alarm Status Indicator (Red LED** - illuminates when the Liebert LDMF detects an alarm. The audible alarm will also sound until the **Silence/Reset** push button is depressed. The LED will remain illuminated until the alarm condition is cleared.
- **Audible Alarm speaker** (represented by the white dot) - a speaker behind the bezel will sound when the Liebert LDMF records an alarm condition. Pressing the **Silence/Reset** push button mutes the audible alarm until another alarm is generated or the alarm condition has cleared.

The middle section includes the display area and navigation keys to change the display:

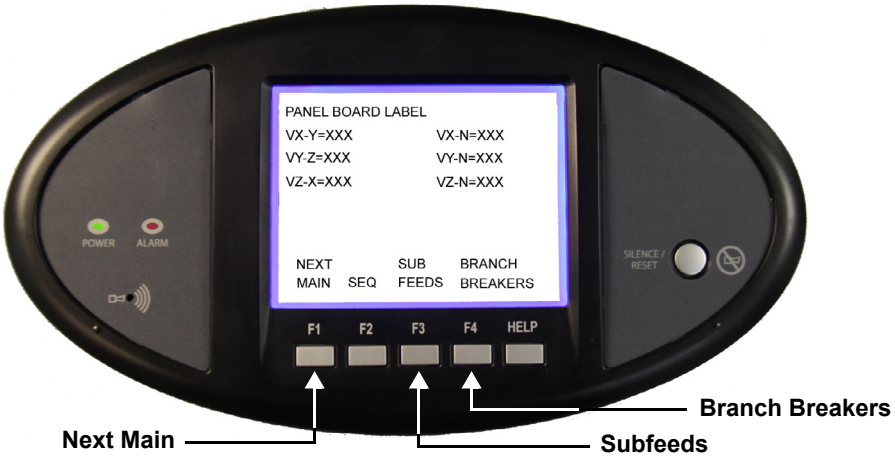
- **LCD viewing area** - displays parametric or alarm data for selected components
- **Navigation keys** (soft function keys F1 through F4 and Help)—some of these keys vary in function, as indicated in the text description above each key:
  - **F1** selects the next major item such as Next Main, Next Subfeed, or Next Branches.
  - **F2** is the Sequence key. It selects the next set of items at the current level or the next item on a list.
  - **F3** can select Subfeeds at the top level or can select a menu item at lower levels.
  - **F4** can select Branch Breakers at the top level or provide a Back function at lower levels. Pressing the Back key (F4) navigates to the top level (Main) except from the Help screen. From the Help screen, the Back key navigates to the previous screen.
  - Pressing the **Help** key navigates to the Help screen.

At right is the alarm **Silence/Reset** button:

- Press the **Silence/Reset** button once and hold to silence the audible alarm.
- Press the **Silence/Reset** button a second time to clear the alarm and turn off the red LED.

5.7.2 Liebert LDMF Parameter Screens

Three types of parameter screens may be selected from the Main Screen by pressing the soft keys labeled *Next Main*, *Subfeeds* and *Branch Breakers* to display the applicable information.



Next Main

Press the *Next Main* key to display parameters for the main breaker feeding power to a panelboard. There may or may not be a physical circuit breaker installed. The Next Main key toggles between the two Main Panelboard breakers in a Liebert Power product with more than one panelboard.

Subfeeds

Press the *Subfeeds* key to show parameters for subfeed breakers—these are usually circuit breakers that feed remote circuits or panelboards. They may reside as separate entities within a Liebert Power product or a special large panelboard.

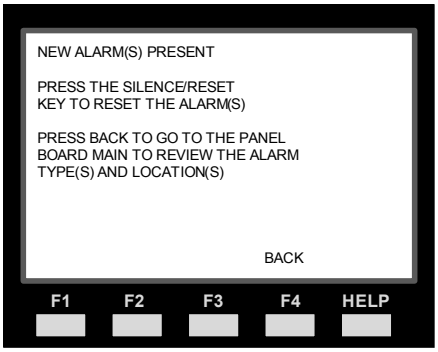
Branch Breakers

Press the *Branch Breakers* key to view parameters for one-, two- or three-pole circuit breakers that reside in the panelboard. The branch data resides at the lowest level except for the alarm summary.

5.7.3 Liebert LDMF Alarms

If any alarms are present when parameter screens are accessed with the Main, Subfeeds or Branch Breakers keys, the Alarm Screen appears, as shown in the example below.

- Press **F4** (Back) to view details about the alarm on the Panelboard Main screen.
- The alarm activates the Audible Alarm and the red Alarm LED.
- Press the **Silence/Reset** key once to silence the audible alarm.
- Press the **Silence/Reset** key a second time to clear the alarm. If all alarms are reset, the display returns to the Main Alarm screen.
- If the alarm condition persists, a new alarm is generated and the sequence is repeated.



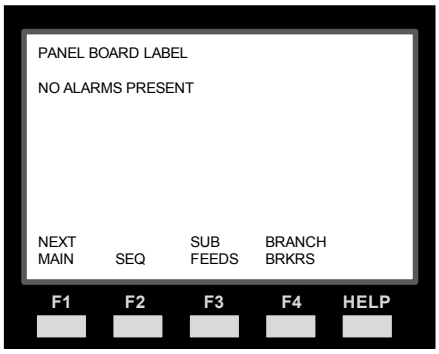
5.7.4 Liebert LDMF Screens

NOTE

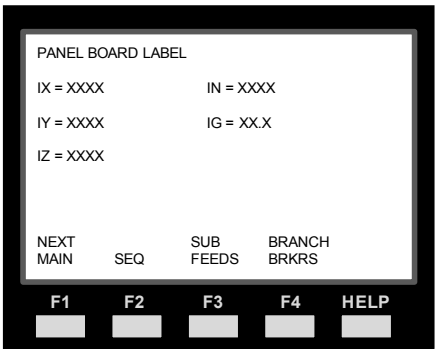
The images below are for representation of the menu items only. The actual display including the Controls and Indicators shown in the images below may not be present.

Figure 1 Main panelboard screens—examples

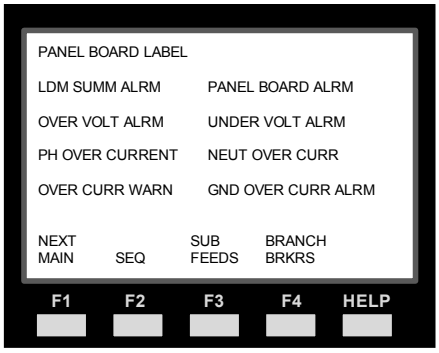
Panelboard Main Screen
(if no alarms are present)



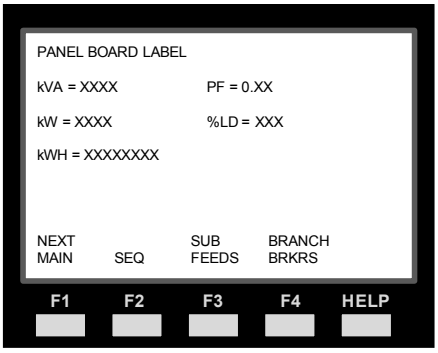
Panelboard Currents



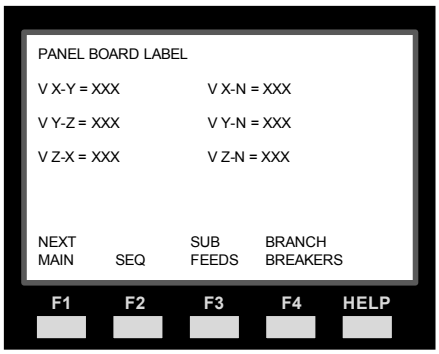
Panelboard Alarms
(appears only if alarms are present)



Panelboard Power Values



Panelboard Voltages



Panelboard Crest Factor (CF)

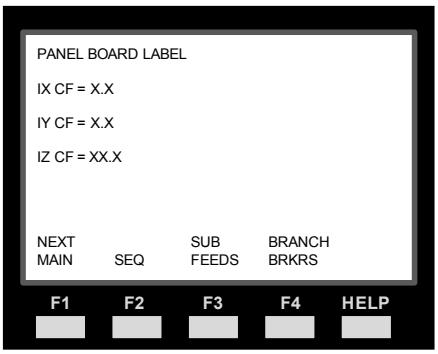
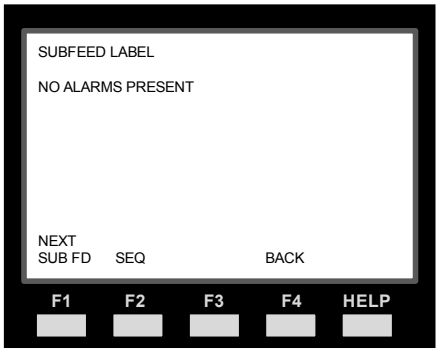
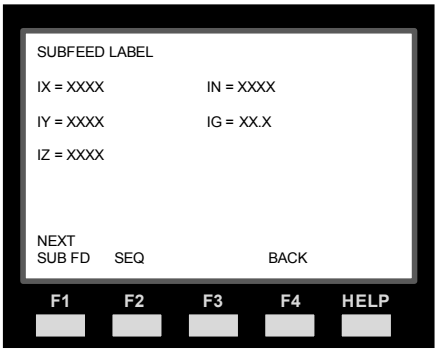


Figure 2 Subfeed screens—examples

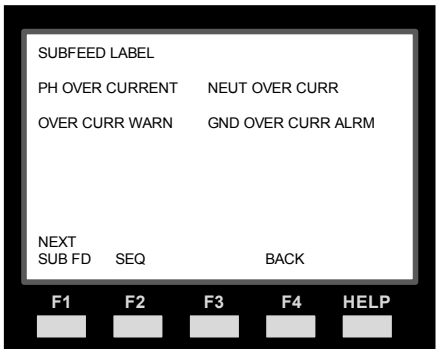
Subfeed Main Screen
(if no alarms are present)



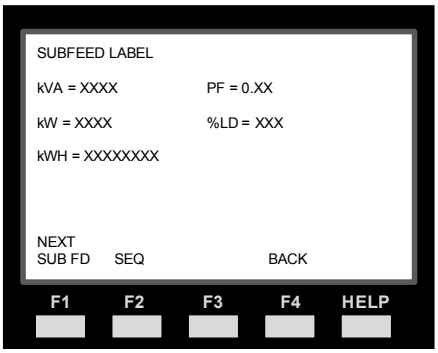
Subfeed Current



Subfeed Alarms
(appears only if alarms are present)



Subfeed Power Values



Subfeed Crest Factor (CF) & THD

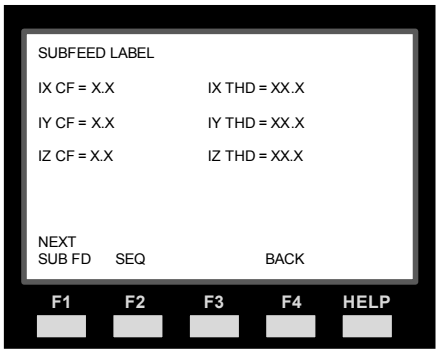
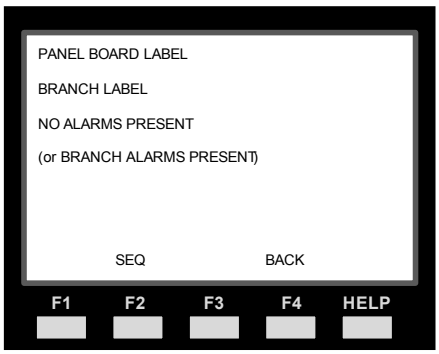
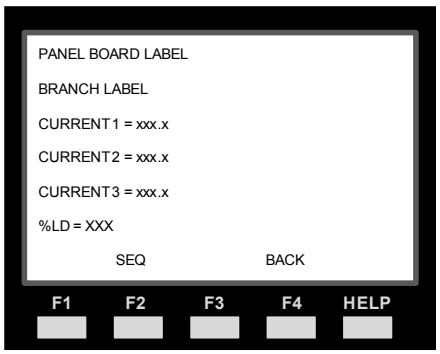


Figure 3 Branch breaker screens—examples

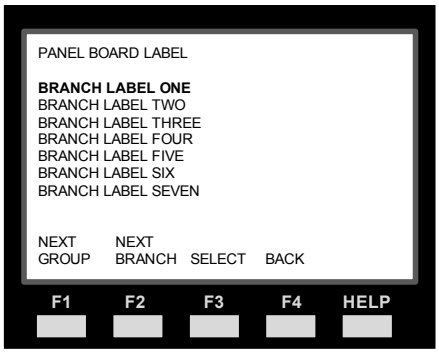
Branch Breaker Main Screen
(if no alarms are present)



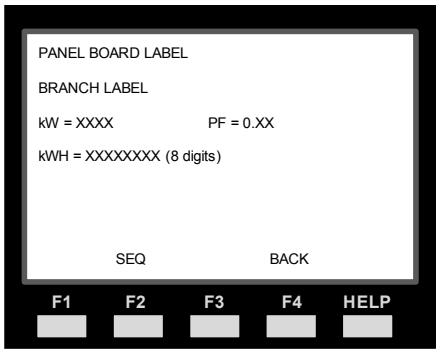
Branch Current



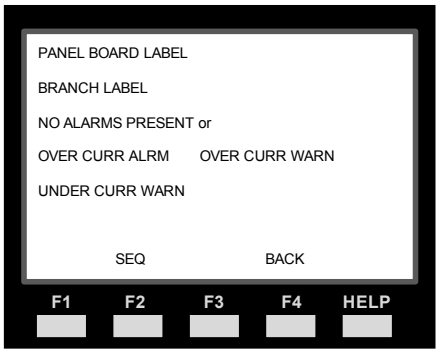
Branch Breakers



Branch Power Values



Branch Alarms



6.0 SPECIFICATIONS

ELECTRICAL	
Voltage	120 - 240 VAC (-13% to +6%)
Frequency	50 and 60Hz
Current Transformers Rating (Secondary Winding)	1A for Branch Circuits and Subfeeds 1A for Panelboard Main Breaker
BSM Current	0.5A to 120A
CT Accuracy	5% for 0.5-2A 1% for 2 - 100A 5% for 100-120A
Minimum Current	200mA
ENVIRONMENTAL	
Humidity	0-95%
Temperature (Non-Operating)	-68°F to 158°F (-20°C to 70°C)
Temperature (Operating)	32°F to 104°F (0°C to 40°C)

7.0 TROUBLESHOOTING / FREQUENTLY ASKED QUESTIONS

1. How do I obtain the software necessary to monitor and configure the Liebert LDMF?
   - The software package is available from the Liebert Web site, **www.liebert.com**. Under **Service and Support**, choose **Software Downloads**.
   - Click on the link for the **LDMF - mm/yyyy Toolkit**:

     where **mm/yyyy** is the month and year of the update—for example, 08/2010 or 11/2012

     Note: There are two versions of Liebert Distribution Monitoring software.

     Be sure to select the **LDMF** version, which is for units with a setup port labeled **LDMF Setup**.

     Do NOT choose the Liebert Distribution Monitoring (LDM) Tool Kit. (The LDM Tool Kit is used on units with a setup port labeled LDM Setup.)
   - Save the file to a desktop or laptop computer (PC) and extract the contents.

   NOTE

   The software may be updated and changed without any notification. Check the Web site regularly to ensure the software is up-to-date.
2. What is contained in the downloaded software package?
   - The flash program with a walk-through instruction
   - The configuration program
   - The monitor program
3. What should I do if the BMS is reporting an overcurrent alarm?
   - Verify the circuit is not actually overloaded.
   - Using the Configuration program, verify that alarm setpoints and the CT ratio are correct.
   - If settings are correct, verify that the BMS is operating correctly.
   - If the issue still exists, contact Emerson Network Power® Liebert Services at 1-800-LIEBERT (1-800-543-2378) for assistance.
4. I get an error message "Incorrect Schema Version" when I try to run the Monitor tool or Configuration tool. What should I do?
   - Ensure that only one program—either Monitor or Configuration—is running at a time. You can't run both programs at the same time.
   - Contact Liebert Services to ensure correct tool for the firmware.
   - Verify the PC is connected to the LDMF Setup port and the communication cable (F-F null modem DB9) is fully seated (see **5.2.1 LDMF Setup Port Connection**).
   - Verify the Liebert LDMF unit has power (green LEDs on the BCB will be flashing).
5. How can I make a backup copy of the configuration file?
   - Connect to the external LDMF Setup port (see **5.2.1 LDMF Setup Port Connection**).
   - Run the configuration program (see **5.5.1 Starting the Configuration Program**).
   - At the bottom of the Configuration window, select **Save to File**. Navigate to a location on your PC to store the file (see **5.5.5 Save the Configuration File to Disk**).

Technical Support / Service

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Environmental Systems
800-543-2778
Outside the United States: 614-888-0246

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